

ASSESSORS' HANDBOOK
SECTION 534

RURAL BUILDING COSTS

JANUARY 2002

CALIFORNIA STATE BOARD OF EQUALIZATION

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FOREWORD

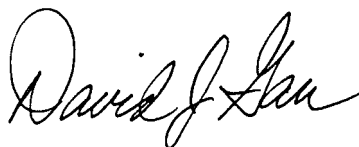
This edition of Assessors' Handbook Section 534, *Rural Building Costs*, updates some costs contained in previous editions and includes new data. As with prior editions, pages are printed in loose-leaf form to allow for insertion of revisions by section or page.

There are increases throughout the state for permits and fees to construct buildings. Because of the variation of charges, appraisers must research and analyze the charges for these permits and fees to see how they affect the rural building construction costs in their county.

General instructions and pertinent information concerning the use of this handbook are contained in an introductory section. Specific instructions and comments applicable to each building type will be found in the introductory pages of the section of the manual devoted to that particular type.

Although diligent efforts have been made to supply accurate and reliable information, it is very important to temper this data with local costs, since construction costs may vary both within and among counties.

This revision was prepared by Policy, Planning, and Standards Division staff under the direction of the Property Taxes Department.

A handwritten signature in black ink, reading "David J. Gau". The signature is fluid and cursive, with a large initial "D" and "G".

David J. Gau
Deputy Director
Property Taxes Department
State Board of Equalization
January 2002

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AH 534.00: INTRODUCTION

BASIS OF COST

Costs in this manual are based on the cost to build on a level and cleared site in California as of the date at the bottom of each page. The costs are contingent on the following assumptions:

- A clear site
- Normal soil conditions
- Adequate site drainage
- Excludes all off-site improvement cost

The costs in this handbook include normal expenses incurred in placing the improvement or component in the hands of the ultimate consumer including the following:

1. Excavation for foundations, piers, and other structural foundation components
2. Materials
3. Labor
4. Architects' fees
5. Engineering fees
6. Supervision
7. Permits for improvements, land use, environmental impact, etc.
8. Normal utility hook-ups, if any
9. Contractor's overhead and profit
10. Contingencies
11. Carrying charges during construction, e.g., taxes, interest
12. Legal expenses
13. Typical sales commissions, costs, and transfer fees

All data are in the form of in-place costs for improvements and additives that may differ between various structures. The costs in this handbook do not include entrepreneur's profit.

AH 534.10: BASIC FARM BUILDINGS

This section contains specifications and costs for various basic farm buildings including the following:

- Prefabricated horse barns
- General purpose barns
- Hay storage barns
- Feed barns
- Pole buildings
- Shops
- Machinery and equipment sheds
- Prefabricated wood storage sheds
- Small sheds

PREFABRICATED HORSE BARNS

SPECIFICATIONS

Structure	6" steel purlins on 6' centers; enamel exterior
Foundation	Concrete piers
Floor	Dirt
Door	Sliding stall (inside tract)
Roof	2" x 12" pitch; skylight in each stall
Roofing	White 26 gauge steel hi-rib
Walls	Laminated wall panels; grilled fronts; top 4'; 5" colored gutter trim

IN LINE SHED ROW BARN

Stall Size	First Stall	Each Additional Stall
12' x 12'	\$2,600	\$2,225
12' x 16'	3,100	2,710

Shed roof overhang per square foot:

8'	—	\$ 4.55
12'	—	\$ 5.15

GABLE ROOF BARN—STANDARD BREEZEWAY

Stall Size	First Two Stalls	Each Additional Two
12' x 12' with 12' breezeway	\$6,750	\$5,700
12' x 12' with 16' breezeway	7,150	6,050
12' x 16' with 12' breezeway	7,900	6,850
12' x 16' with 16' breezeway	8,350	7,250

GABLE ROOF BARN—RAISED BREEZEWAY

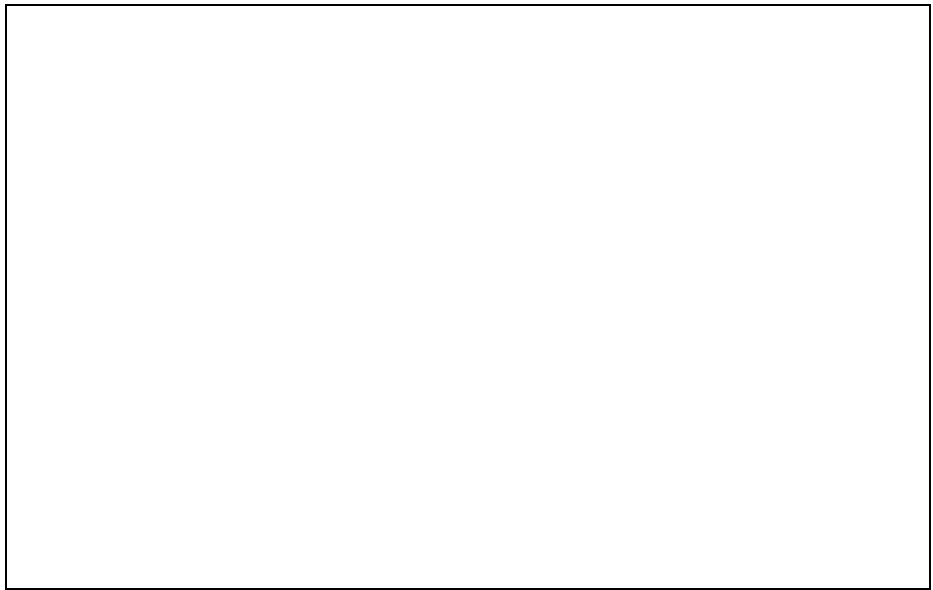
Stall Size	First Two Stalls	Each Additional Two
12' x 12' with 12' breezeway	\$7,480	\$6,400
12' x 12' with 16' breezeway	8,140	7,000
12' x 16' with 12' breezeway	8,850	7,750
12' x 16' with 16' breezeway	9,530	8,350

Roof extension per square foot—**\$5.15**
12-foot Breezeway Doors—**\$700 each**
16-foot Breezeway Doors—**\$800 each**

ADDITIVES

Item	Cost
Concrete floor	\$3.00 per square foot
Full footing	\$8.75 per lineal foot
Portable 5'-4 rail corral panels	\$6.75 - \$7.75 per lineal foot
Portable 5'-5 rail corral panels	\$7.50 - \$8.00 per lineal foot
Portable 6' rail corral panels with metal roof	\$4.75 - \$5.75 per square foot

PREFABRICATED HORSE BARNS

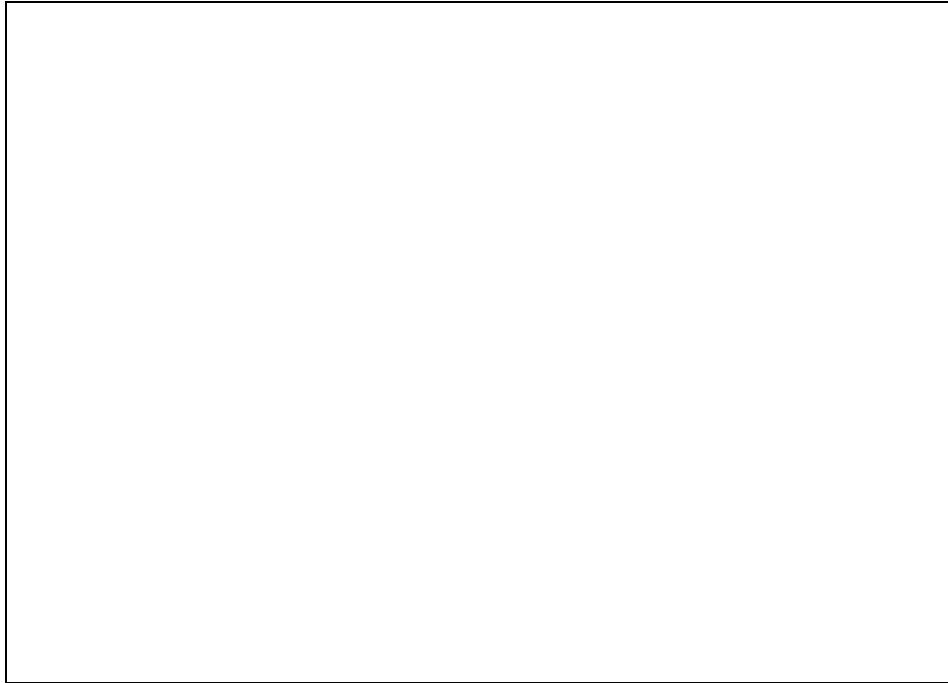


SHED ROW WITH 8 FOOT ROOF EXTENSION

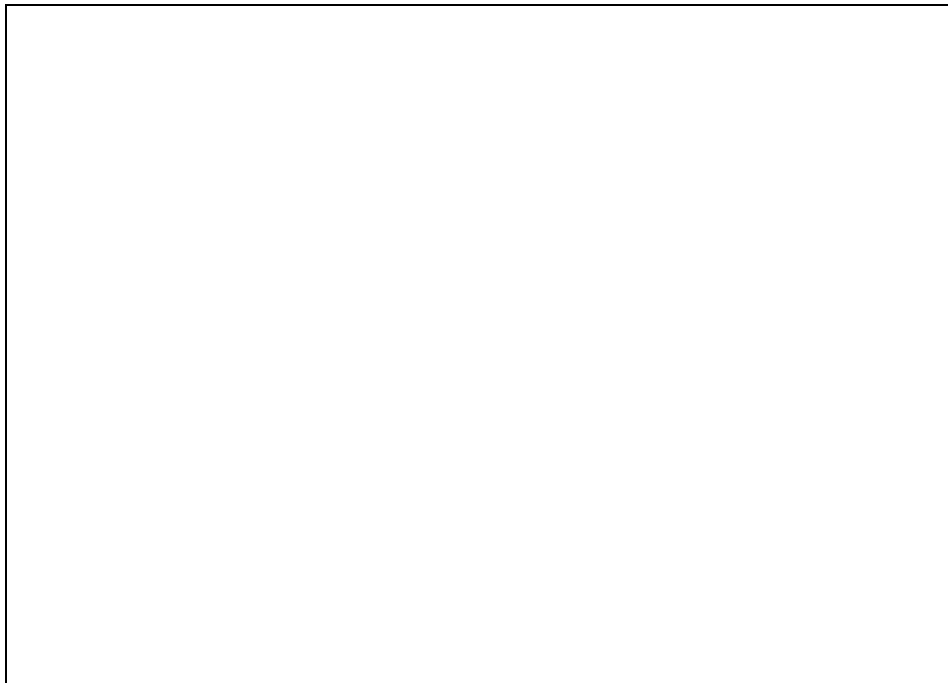


GABLE ROOF WITH RAISED BREEZEWAY

PREFABRICATED HORSE BARNS

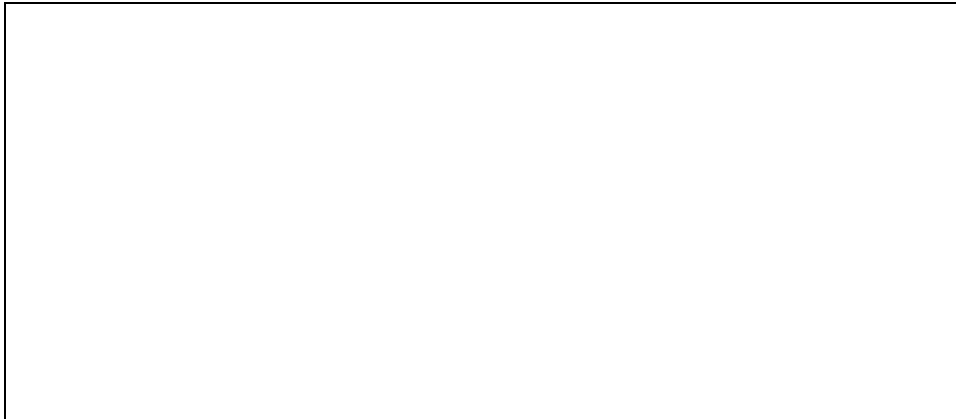


GABLE ROOF—RAISED BREEZEWAY WITH ROOF EXTENSION



12' X 12' STALL

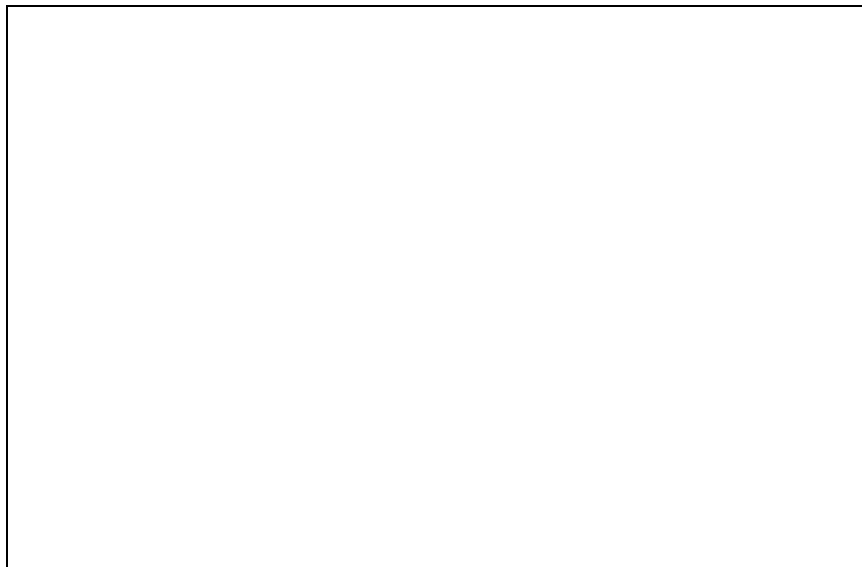
GENERAL PURPOSE BARNs



FAIR QUALITY



AVERAGE QUALITY



GOOD QUALITY

GENERAL PURPOSE BARNs

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt/some concrete	Concrete
Wall Structure	Light wood frame, 10' eave height	Average wood frame, 10' eave height	Good wood frame, 10' eave height
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to high pitch—average wood trusses	Medium to high pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets

SQUARE-FOOT COSTS

Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
1	13.55	10.50	9.75	9.36	9.00	8.80
2	17.40	14.20	13.20	12.70	12.40	12.00
3	26.68	21.86	20.22	19.47	19.00	18.57

HAY STORAGE BARNs

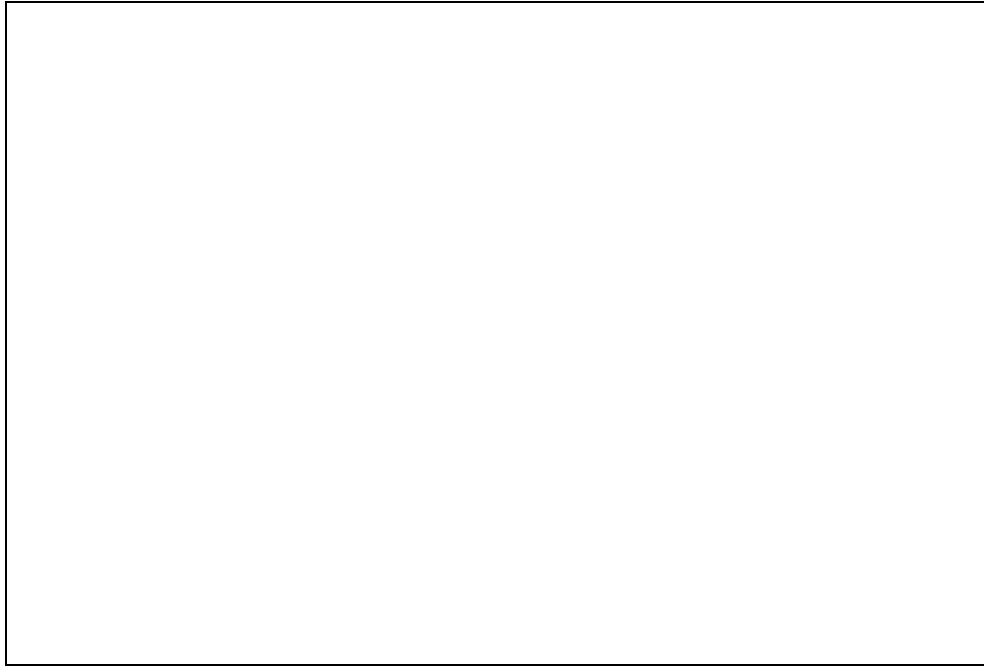
BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt	Concrete
Wall Structure	Light wood frame, 20' eave height	Average wood frame, 20' eave height	Good wood frame, 20' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum	Good wood siding, painted or 26-gauge steel
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to high pitch—average wood trusses	Medium to high pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets
Shape	Nearly square, length between one and two times width	Nearly square, length between one and two times width	Nearly square, length between one and two times width

SQUARE-FOOT COSTS

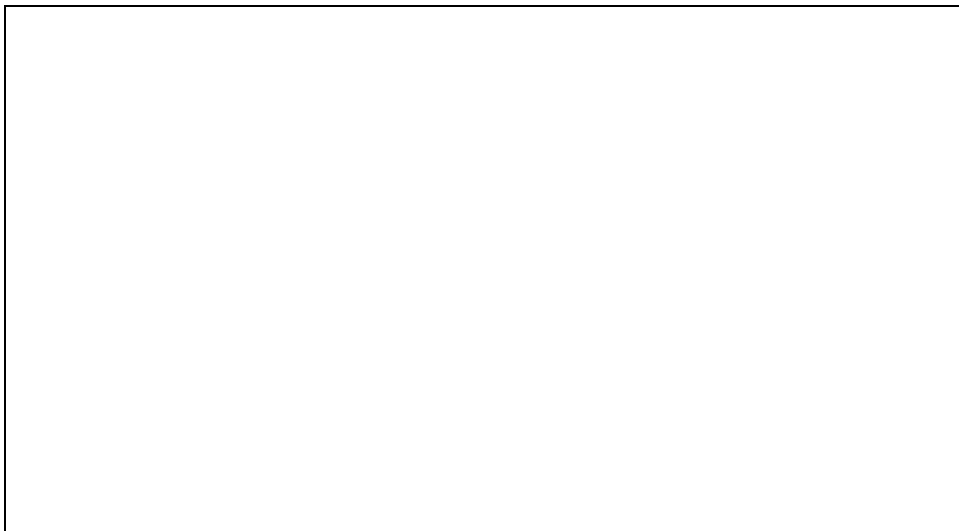
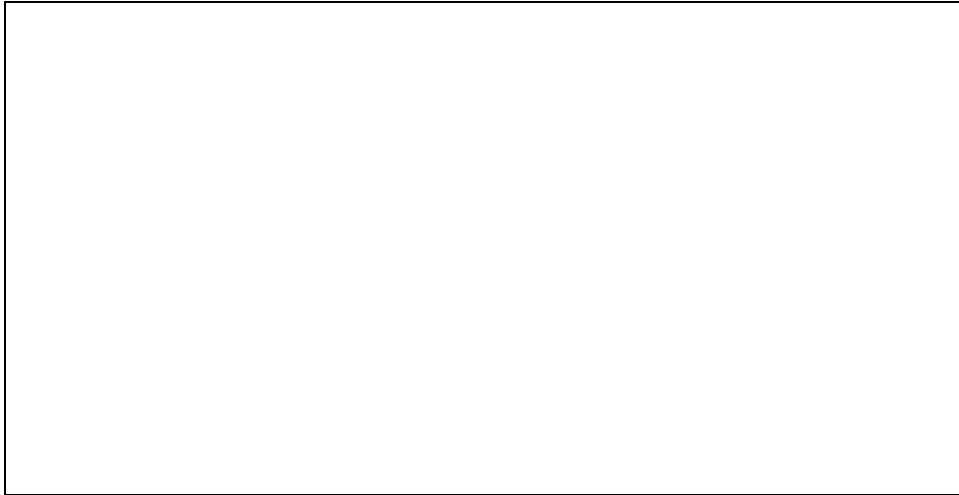
Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
1	11.19	9.32	8.42	7.85	7.51	7.16
2	12.79	10.63	9.67	8.99	8.53	8.24
3	20.87	17.38	15.63	14.65	13.98	13.44

HAY STORAGE BARNS



AVERAGE-QUALITY HAY STORAGE BARN

FEED BARNS



FEED BARNS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Concrete in center section	Concrete
Wall Structure	Light wood frame, 8' eave height at drip line	Average wood frame, 8' eave height at drip line	Good wood frame, 8' eave height at drip line
Exterior Wall Cover	Open sides and ends	Open sides, standard gauge corrugated iron, aluminum, or average wood siding on ends	Open sides, good siding painted on ends
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to low pitch—average wood trusses	Medium to low pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets

SQUARE-FOOT COSTS

Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
1	7.07	6.51	6.24	6.14	6.07	6.01
2	11.16	10.26	9.88	9.76	9.64	9.60
3	12.98	11.92	11.60	11.42	11.31	11.26

POLE BUILDINGS

BUILDING SPECIFICATIONS

Structure	Poles: 15' to 20' on center; wood or steel
Floor	Dirt
Roof	Light trusses; low to medium pitch; wood or steel
Roofing	Galvanized steel or colored steel with gutter
Walls	None, wall height: 18' - 21' to plate

SQUARE-FOOT COSTS

ALL SIDES OPEN

GOOD QUALITY

End Width	Side Length									
	30	50	80	100	120	140	150	160	180	200
20	6.38	6.08	5.92	5.76	5.66	5.56	5.51	5.46	5.41	5.41
30	5.81	5.66	5.51	5.35	5.25	5.15	5.10	5.05	4.99	4.94
40	5.46	5.30	5.15	4.99	4.83	4.73	4.68	4.68	4.68	4.68
50	5.15	4.99	4.83	4.68	4.53	4.48	4.48	4.48	4.48	4.48
60	4.89	4.73	4.53	4.48	4.48	4.48	4.48	4.48	4.48	4.48
70	4.89	4.68	4.53	4.48	4.48	4.43	4.43	4.43	4.43	4.43
80	4.89	4.68	4.53	4.48	4.48	4.43	4.43	4.43	4.43	4.43

Deduct 15 percent for light duty, fair quality construction.

Skylights (2' x 10') **\$100.00** each

Vents (14", Rotary) **\$200.00** each

Poles, In-Place **\$85.00** each

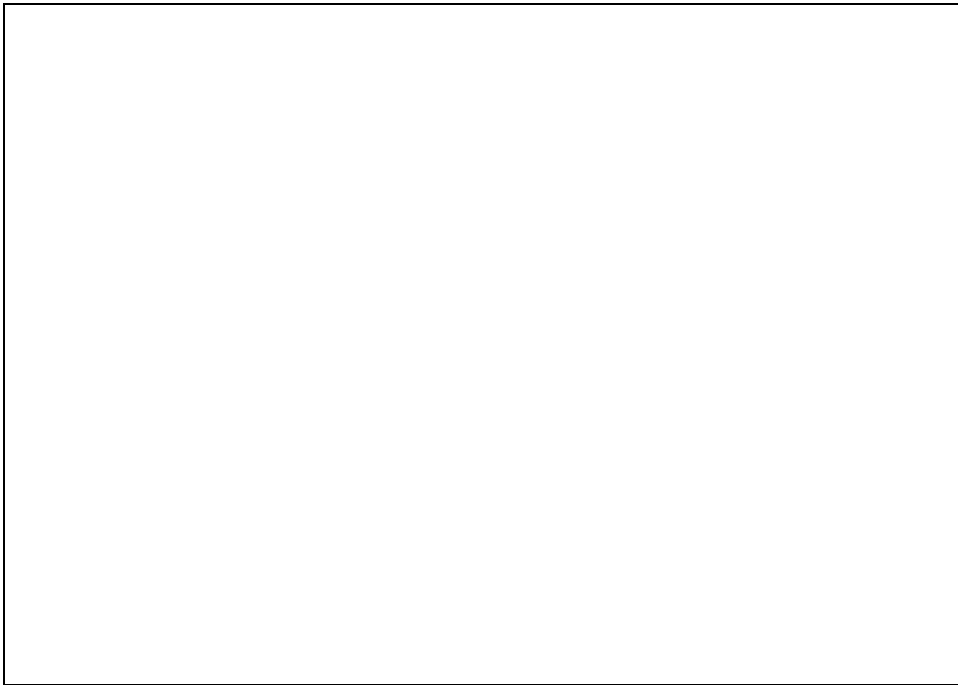
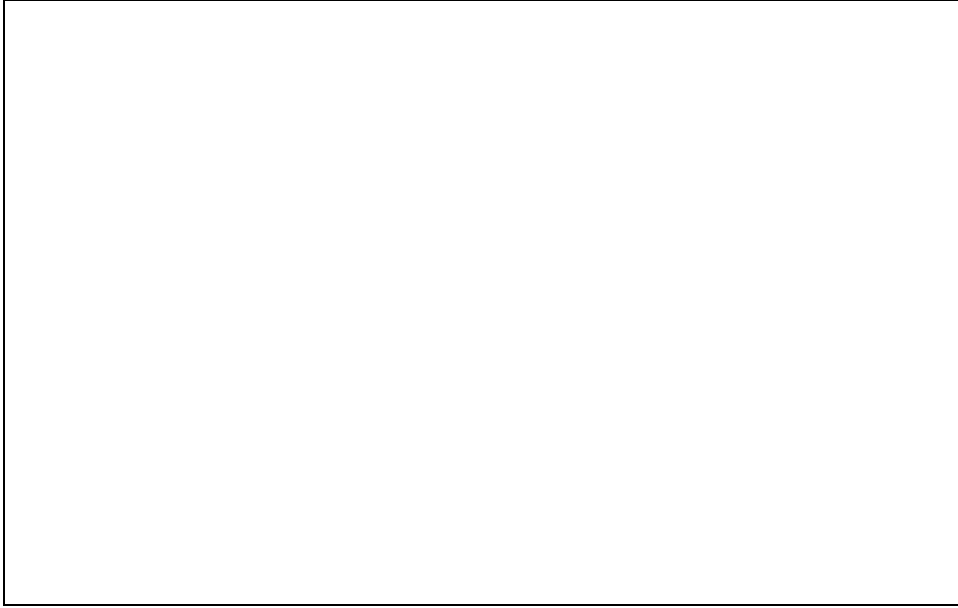
Covered wall area add **\$3.50** per square foot of wall surface

Reinforced Concrete Floors:

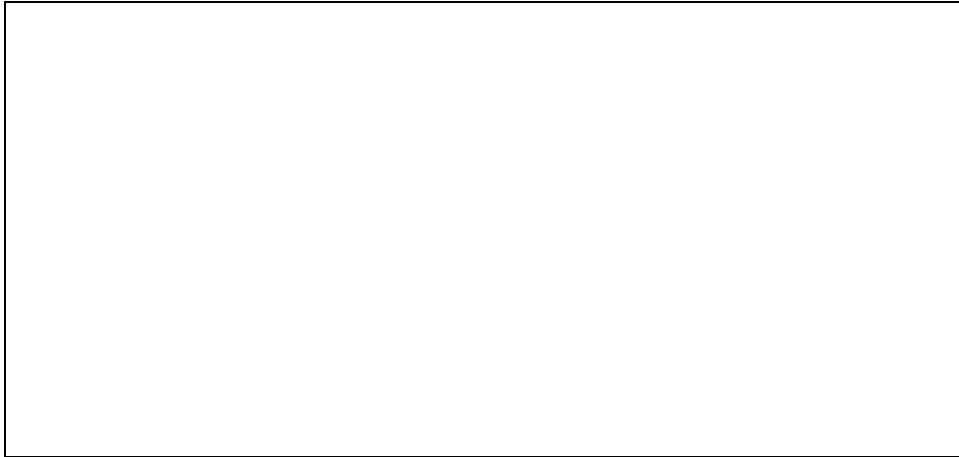
4" **\$2.25** per square foot

6" **\$3.00** per square foot

POLE BUILDING



SHOPS



AVERAGE QUALITY SHOPS

SHOPS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Light concrete	Light concrete	Standard concrete
Floor	3" concrete	4" concrete	4" reinforced concrete
Wall Structure	Light wood frame, 15' eave height	Average wood frame, 15' eave height	Good wood frame, 15' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron, aluminum, or average wood siding	Good wood siding painted or 26-gauge steel
Roof Construction	Low to medium pitch— 2" x 4" rafters, 24" to 36" on center, or light wood trusses	Low to medium pitch— average wood trusses	Medium pitch— good wood trusses
Roof Cover	Light aluminum corrugated	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	Two outlets per 1,000 square feet	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets
Doors	One light sliding or swinging door per 2,000 square feet	One average sliding or swinging door per 2,000 square feet	One drive-thru door per 1,000 square feet plus one walk-thru door
Windows	None	None or few low cost	5 percent of floor area
Shape	Nearly square, length between one to three times width	Nearly square, length between one to three times width	Nearly square, length between one to three times width

SQUARE-FOOT COSTS

Class	Square-Foot Area									
	1,000	1,500	2,000	2,500	3,000	4,000	5,000	6,000	8,000	10,000
1	14.24	13.09	12.25	11.65	11.10	10.81	10.49	10.21	9.93	9.66
2	17.88	16.50	15.34	14.79	14.24	13.64	13.10	12.80	12.54	12.25
3	20.62	20.62	19.48	18.68	17.86	17.27	16.73	16.19	15.61	15.05

MACHINERY AND EQUIPMENT SHEDS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Concrete	Concrete
Wall Structure	Light wood frame, 10' to 12' eave height	Average wood frame, 10' to 12' eave height	Good wood frame, 10' to 12' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum	Good wood siding, painted or 26-gauge steel
Roof Construction	Low to medium pitch—shed type, light wood framing	Low to medium pitch—gable or shed type, average wood framing	Low to medium pitch—gable or shed type, good wood framing
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Shape	Usually elongated, width between 15 and 30 feet, any length	Usually elongated, width between 15 and 30 feet, any length	Usually elongated, width between 15 and 30 feet, any length

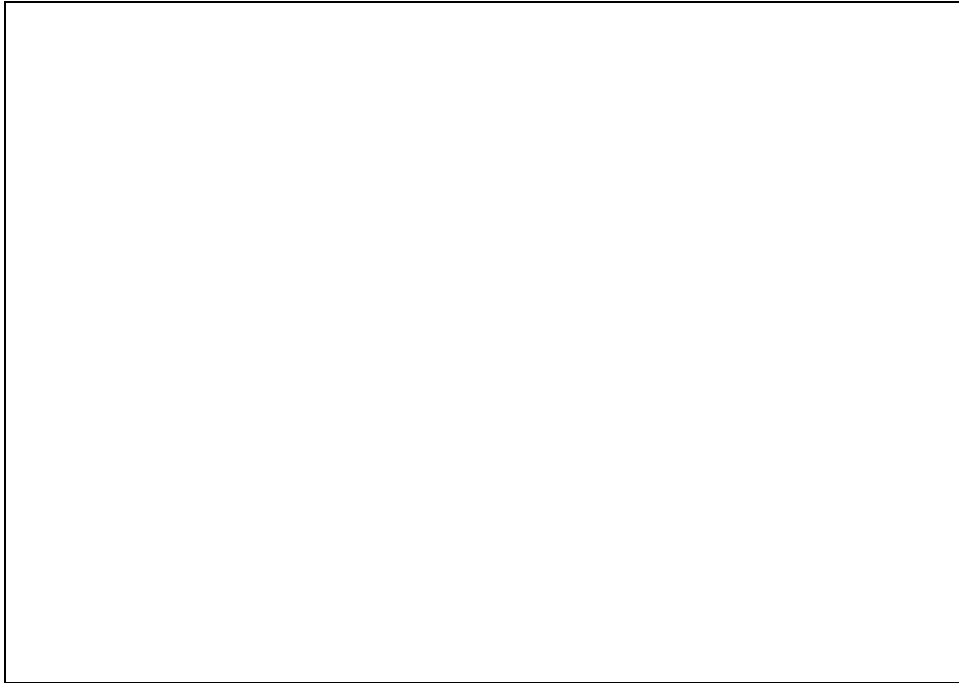
SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

Class	Square-Foot Area										
	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	9.00	8.09	7.52	7.25	7.37	7.03	6.97	6.87	6.80	6.74	6.70
2	13.47	11.75	11.20	10.93	10.69	10.43	10.35	10.30	10.24	10.19	10.14
3	17.44	15.74	14.65	14.37	14.04	13.88	13.71	13.60	13.50	13.40	13.33

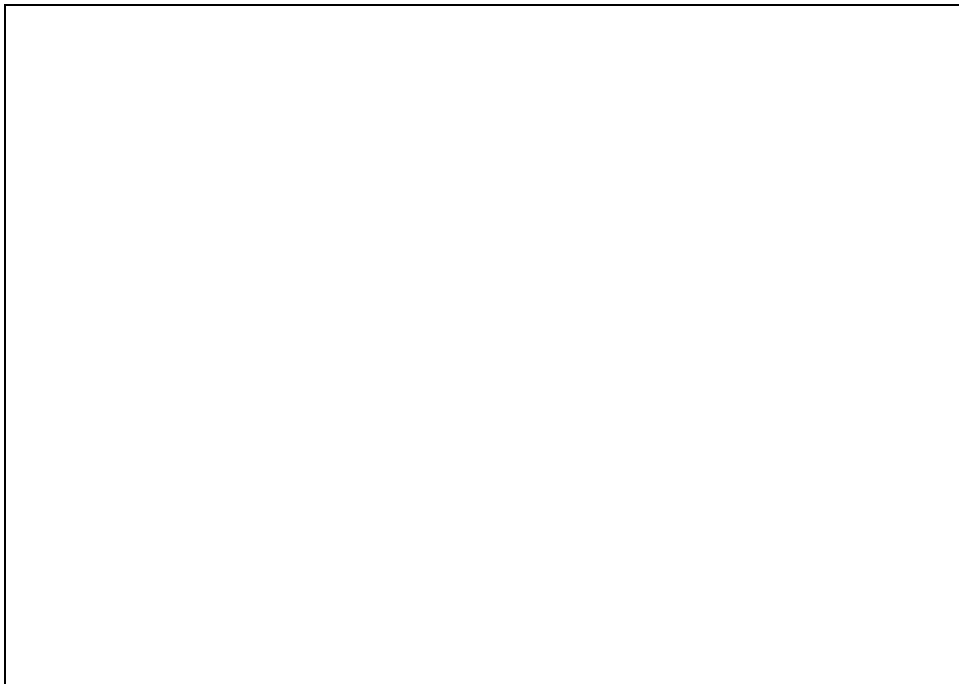
SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

Class	Square-Foot Area										
	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	7.90	6.64	6.24	6.02	5.91	5.85	5.79	5.74	5.69	5.63	5.58
2	12.31	10.58	9.76	9.47	9.19	9.12	8.97	8.91	8.86	8.76	8.70
3	14.25	13.77	12.95	12.41	12.07	11.91	11.81	11.69	11.64	11.57	11.52

MACHINERY AND EQUIPMENT SHEDS

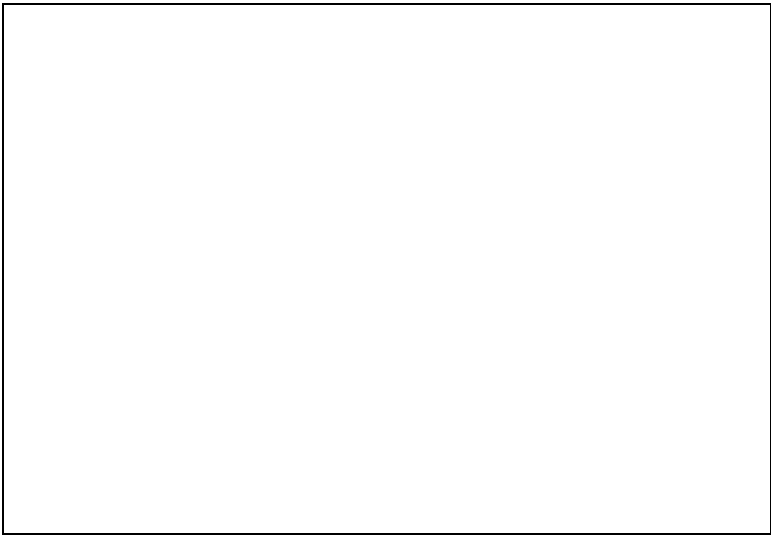
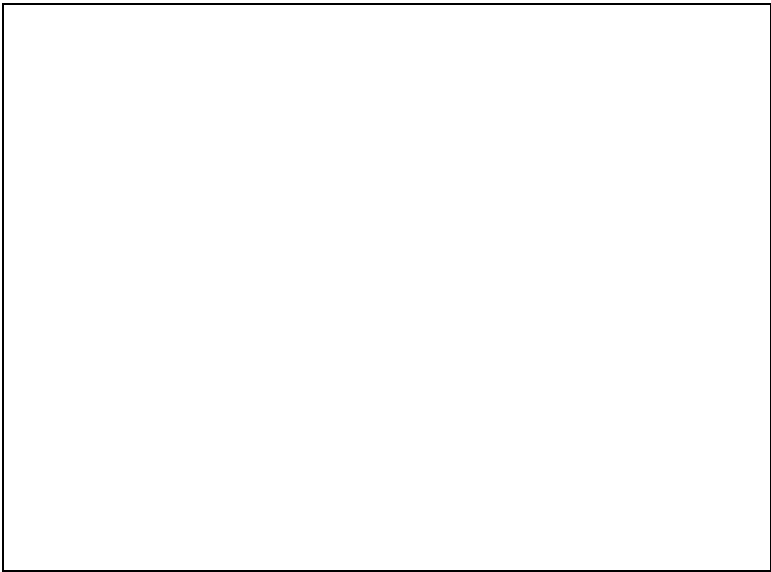


FAIR-QUALITY EQUIPMENT SHED



AVERAGE-QUALITY EQUIPMENT SHED

PREFABRICATED WOOD STORAGE SHEDS



AVERAGE QUALITY

PREFABRICATED WOOD STORAGE SHEDS

Prefabricated wood storage sheds are normally purchased at lumber yards and home improvement centers.

BUILDING SPECIFICATIONS

Foundation	4" x 4" skids or 2" x 6" floor joists
Floor	Plywood or particleboard
Walls Structure	2" x 4" framing on 24" centers, 6 ½' to 7 ½' eve height
Exterior Wall Cover	Plywood or particleboard with one 4' x 6' door
Roof	Gable low to medium pitch, 2" x 4" rafters
Roof Cover	Metal or composition shingles

SQUARE-FOOT COSTS

Square Feet	Price Per Square Foot
50 to 74	\$17.60
75 to 99	\$15.30
100 to 139	\$14.30
140 to 199	\$13.25
200 and up	\$10.90 - \$12.15

ADDITIVES

Windows	2' x 2'	\$60
	3' x 2'	\$75
Doors—Double 6' Wide		\$70
Skylight—2' x 2'		\$115
Turbine Vent		\$65
Shelves—16" wide		\$3.25 per linear foot
Shelves—24" wide		\$3.75 per linear foot
Workbench—24" wide		\$4.50 per linear foot
Steel roll-up door		\$55 per foot (width)
Loft		\$3.25 per square foot

SMALL SHEDS

BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Boards	Concrete
Wall Structure	Light wood frame, 8' eave height	Average wood frame, 8' eave height	Good wood frame, 8' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum, or average framing	Good wood siding, painted, or steel
Roof Construction	Low to medium pitch—shed type, light wood framing	Low to medium pitch—gable or shed type, average wood framing	Low to medium pitch—gable or shed type, good wood framing
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; good steel cover; composition shingles
Electrical	None	None	None
Shape	Usually elongated, width between 6 and 12 feet, any length	Usually elongated, width between 6 and 12 feet, any length	Usually elongated, width between 6 and 12 feet, any length

SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

Class	Square-Foot Area										
	50	60	80	100	120	150	200	250	300	400	500
1	12.65	11.45	10.24	8.75	8.40	7.85	7.55	7.25	6.90	6.65	6.30
2	17.75	15.95	14.45	13.30	12.65	12.05	11.50	10.90	10.25	9.95	9.65
3	22.40	20.05	18.65	17.50	16.25	15.05	14.15	13.60	12.95	12.65	12.35

SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

Class	Square-Foot Area										
	50	60	80	100	120	150	200	250	300	400	500
1	9.00	8.40	7.85	7.25	6.60	6.30	5.85	5.50	5.25	4.90	4.75
2	13.30	12.35	11.45	10.80	10.25	9.65	9.00	8.40	8.10	7.85	7.75
3	16.65	14.95	14.45	13.55	12.65	12.05	11.55	10.80	10.25	9.65	9.35

AH 534.20: DAIRY BARNES

This section contains structures and equipment typically used at a dairy. Specifications and costs are provided for the following:

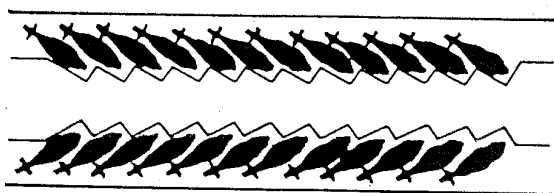
- Commonly used milking parlors
- Rotary barns
- Parallel barns
- Modern Herringbone barns
- Holding, wash, and drip area equipment
- Dairy equipment
- Freestall barn
- Hospital barn
- Corrals
- Commodity barns
- Hay barns
- Miscellaneous equipment
- Septic tanks
- Feedlane stanchions
- Silage pits
- Liquid manure systems
- Feed tanks
- Grade "B" barns
- Stanchion barns
- Walk-through type barns

DAIRY BARNS

COMMONLY USED MILKING PARLORS

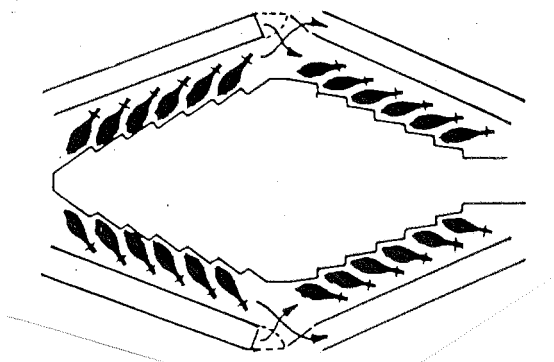
Below are three of the most common styles of milking barns used in California. The most frequently found is the herringbone or sawtooth design. There are several variations of this design. The polygon design is a parlor using multiple sets of herringbone stalls. The parallel design is gaining popularity, especially in larger parlors. The mentioned parlors all have a central pit for the milker, with cows elevated on one or all sides. The following details show basic differences of each design.

HERRINGBONE (DOUBLE 12)



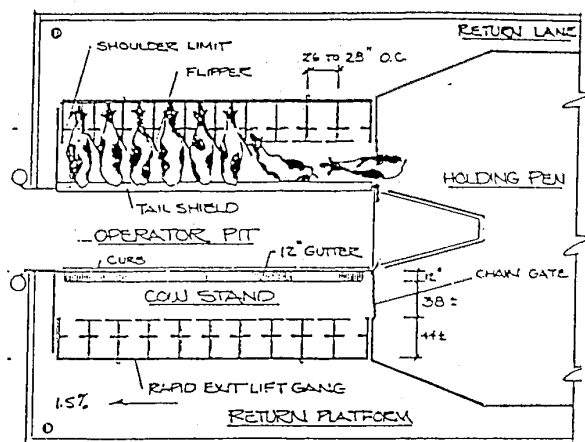
All cows on either side of the pit enter and leave as a group. Newer parlors may have 20 to 30 cows to a side. Some have rapid exit group side release.

POLYGON



Each of the four sides has separate group entry and exit. Usually each side is a herringbone configuration, but can have angle modifications.

PARALLEL (DOUBLE 10)

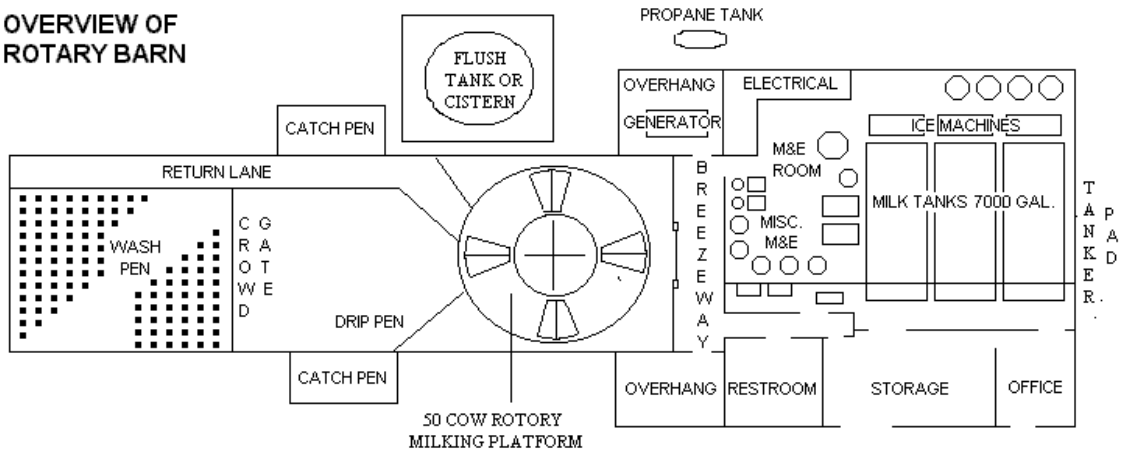


In this design, cows are milked from the rear, rather than the side. Thus, more cows can be milked in a given space than with other designs. Usually a rapid gang exit is present. Typical size is a double 20' to 30'.

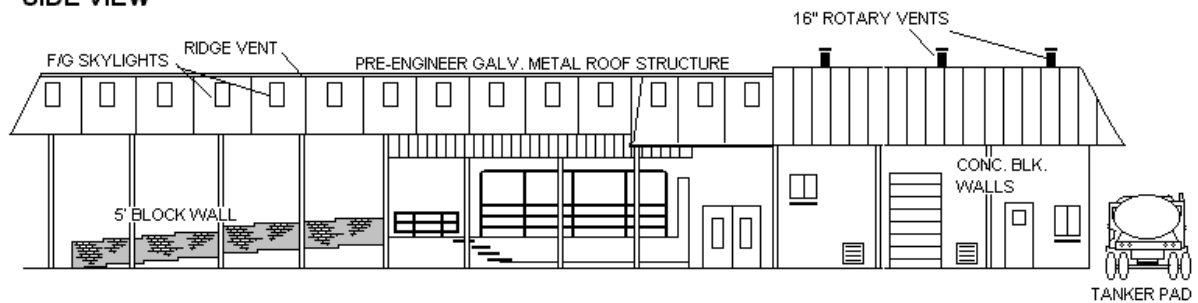
DAIRY BARNS

50-COW ROTARY BARN

OVERVIEW OF ROTARY BARN

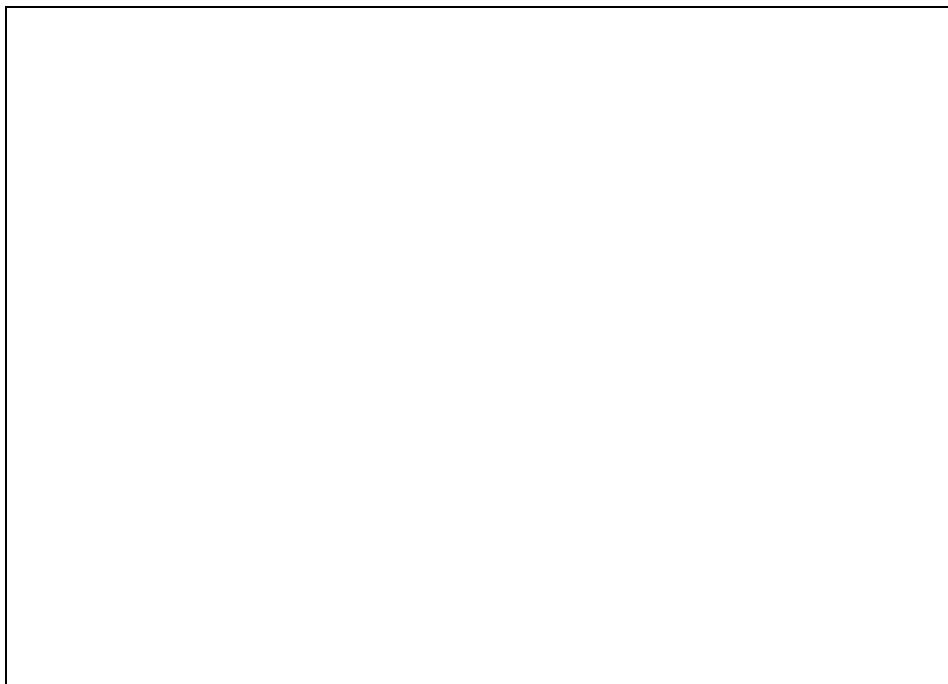
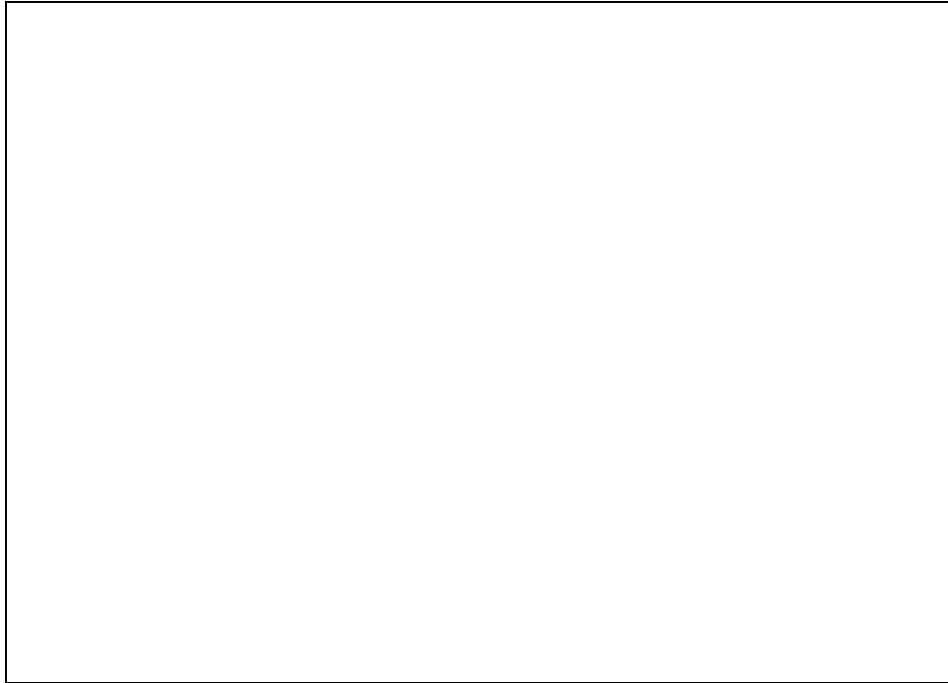


SIDE VIEW



DAIRY BARN

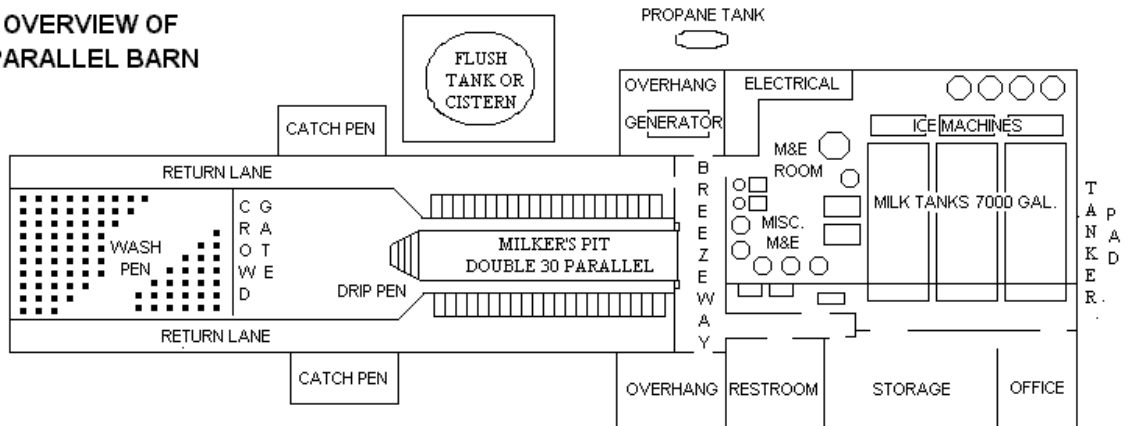
50-COW ROTARY MILKING PARLOR



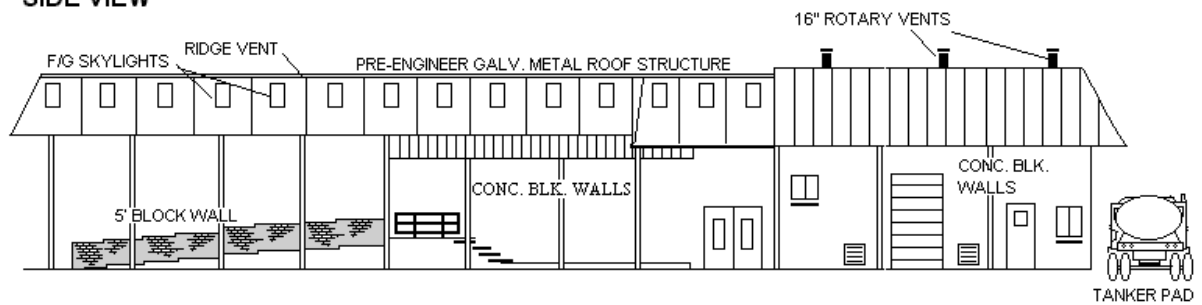
DAIRY BARNS

DOUBLE 30 PARALLEL BARN

OVERVIEW OF PARALLEL BARN



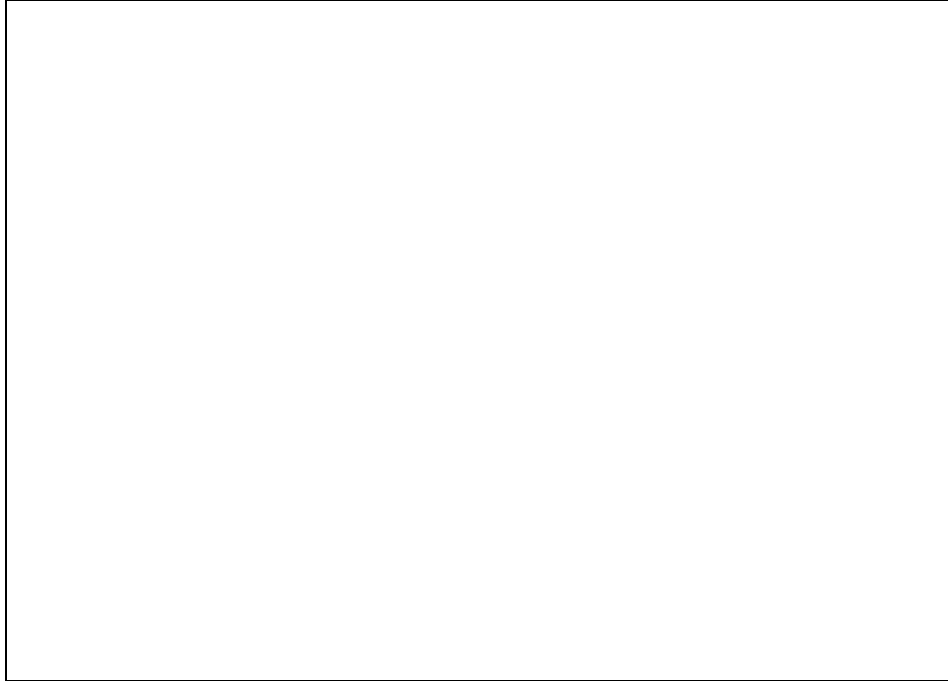
SIDE VIEW



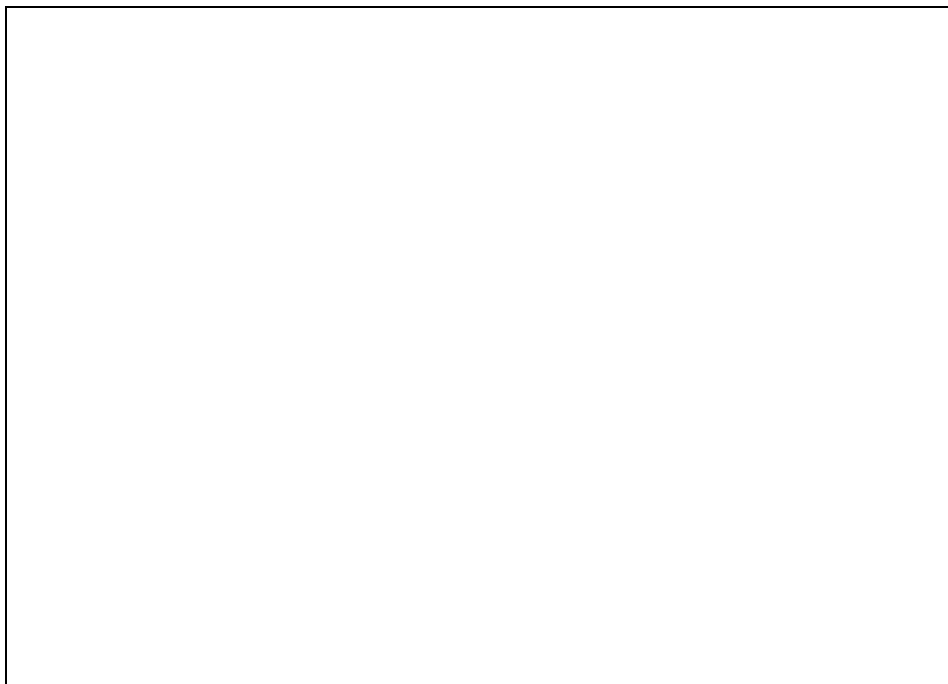
DAIRY BARNS

EXTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY

AVERAGE QUALITY



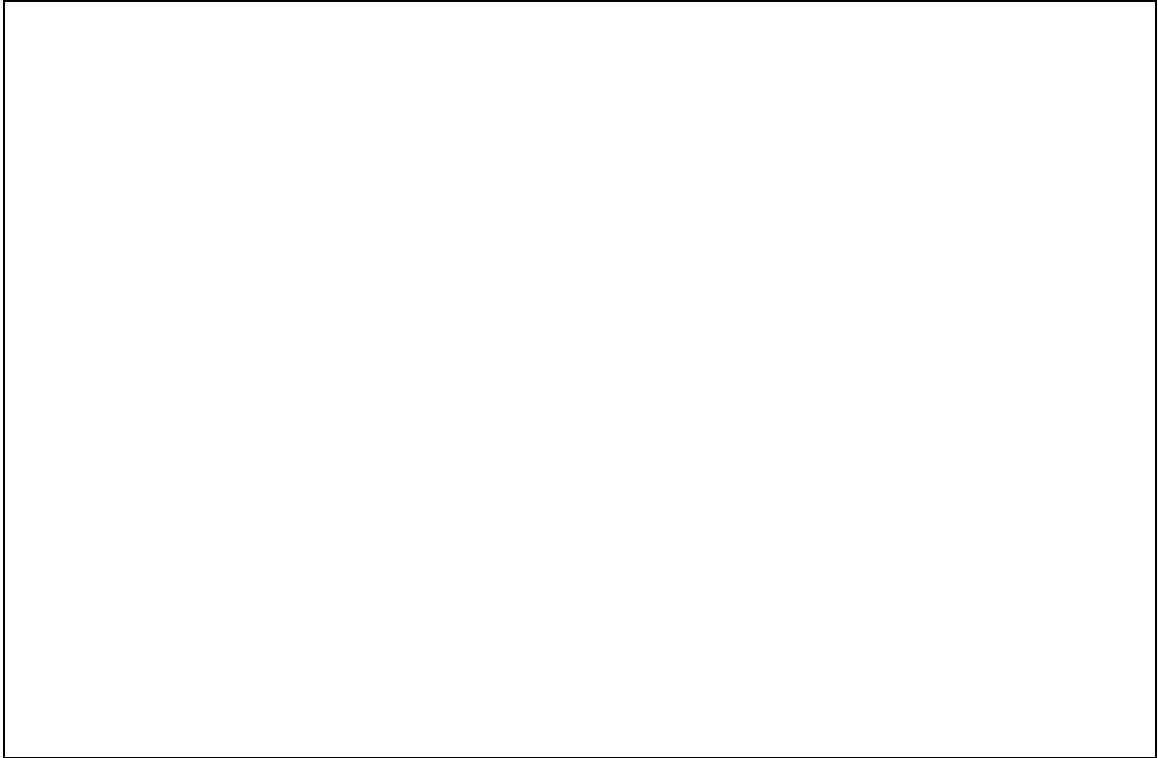
Equipment, office, milk room



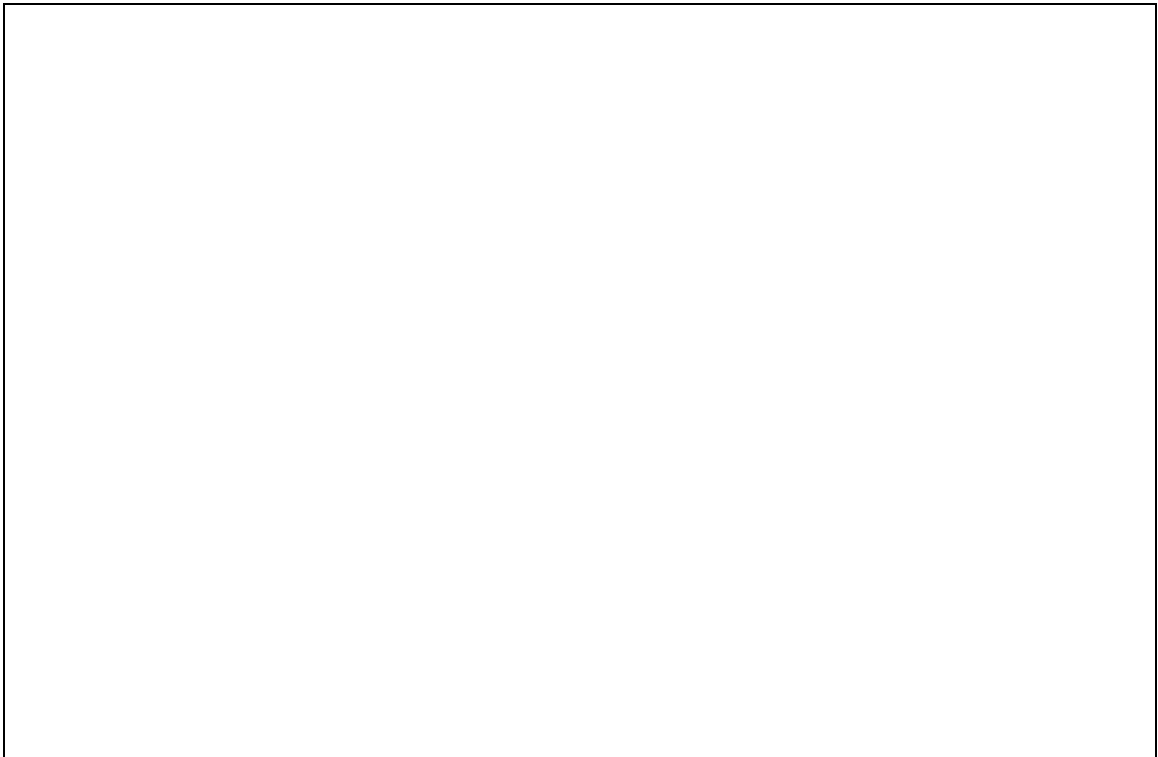
Milking parlor and wash area

DAIRY BARNS

INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY

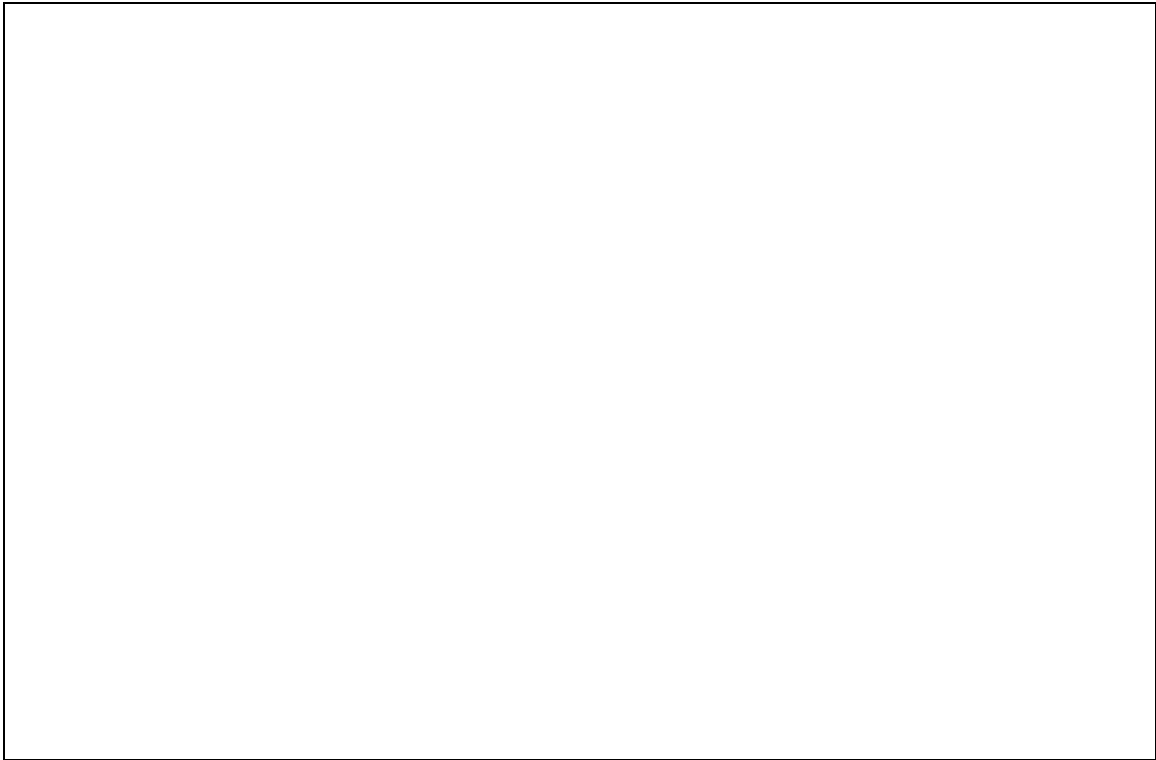


Milk room – good quality

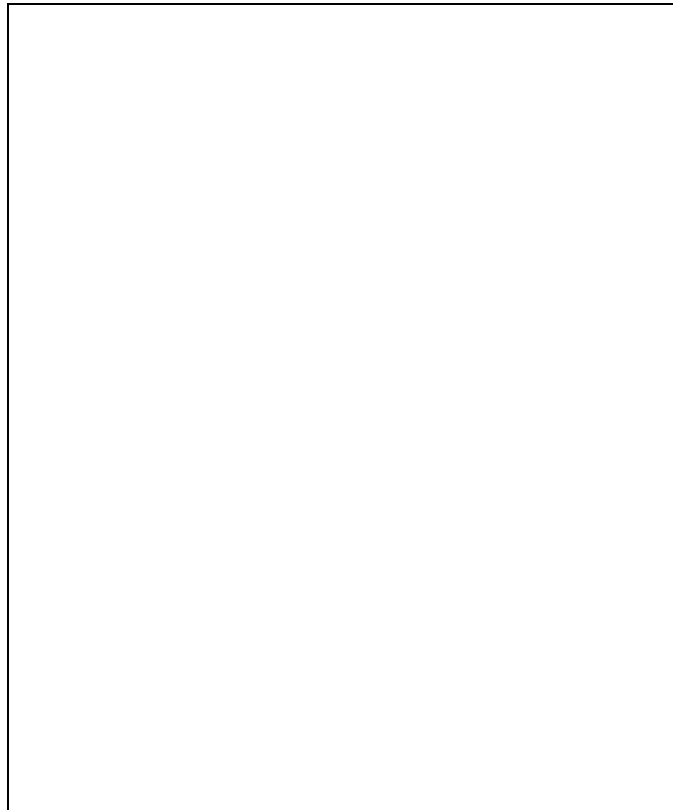


DAIRY BARNS

INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY



Milk room – average quality



DAIRY BARNS

MODERN HERRINGBONE, PARALLEL, OR ROTARY

High end of the range in cost is for Sacramento and Northern California

Major electrical to run milking equipment—mains and subpanels, breakers and master start switches—are considered fixtures and are not included in building costs.

EQUIPMENT ROOM, OFFICE, BREEZEWAY, MILK ROOM, RESTROOM, BATH

Components	Average Quality	Good Quality
Foundation	Reinforced concrete	Reinforced concrete
Floors	Concrete slab	Concrete slab, reinforced
Walls	8" concrete block	Concrete block
Exterior	Stucco or concrete block	Stucco and masonry veneer, split face
Roof Structure and Roofing	Average wood frame, corrugated iron roofing	Good wood frame, good quality roofing or steel beams and good steel roofing or tile, skylights, gutters
Windows	Metal sash 10 percent of wall area	Metal sash 10 percent of wall area
Interior	Smooth finish plaster—cove base	Tile
Electrical	Conduit—average fixtures	Conduit—average fixtures
Plumbing	One stainless steel sink, one water heater, one lavatory, one water closet, usual floor drains	One stainless steel sink, one water heater, $\frac{3}{4}$ bath, vinyl floor and tape textured walls, usual floor drains
Square-Foot Cost	\$40.00 to \$43.50 per square foot	\$43.50 to \$49.50 per square foot

MILKING PARLOR

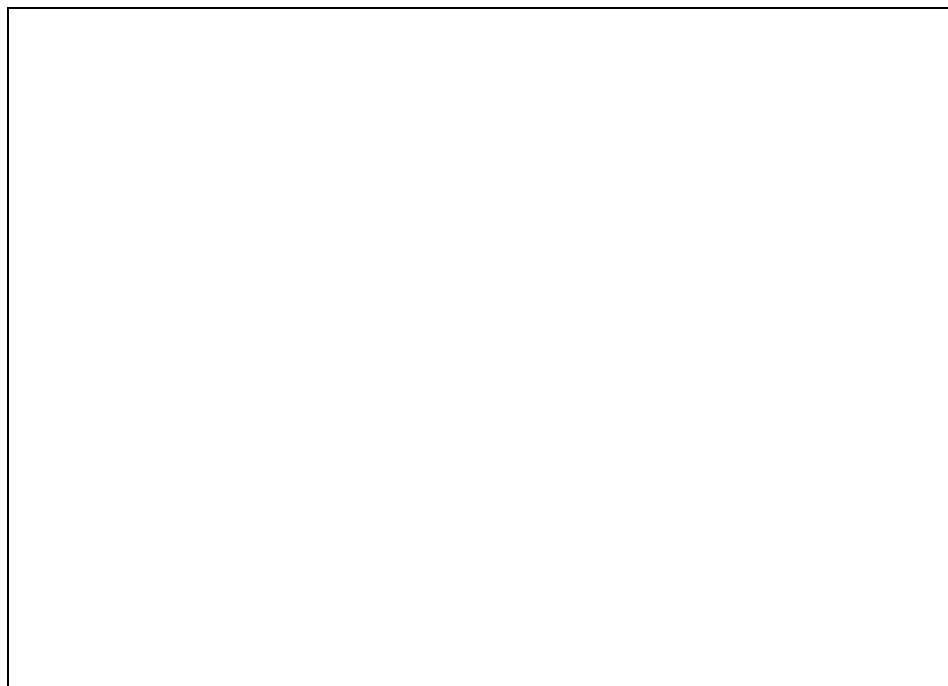
Foundation	6" reinforced concrete
Floors	Concrete slab—well-formed gutters and mangers
Walls	6" or 8" concrete block or reinforced concrete 60" high with 2" x 6"—16" on center framing above, or all concrete block
Roof Structure and Roofing	Average wood frame, corrugated iron roofing or steel beams, good steel roofing, skylights
Windows	Metal sash or metal louvers
Interior	Smooth plaster or tile 36" high
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
Square-Foot Cost	Without gates and feeding equipment—\$24.50 to \$29.00 per square foot

Total building cost, which includes equipment room, milk room, office, bath, supply, milking parlor, and wash and drip area—Average quality **\$25.00 to \$27.00**
 Good quality **\$27.00 to \$32.00**

DAIRY BARNS

HOLDING, WASH, AND DRIP AREA EQUIPMENT

Floor or Ramp	Sloping concrete with carborundum finish. \$2.75 - \$3.00 per square foot
Walls	5' to 6' high plastered (or similar) interior. \$36.00 per lineal foot
Metal Rail Fence	Welded pipe 7'—10' o.c. in concrete. \$8.50 - \$10.00 per lineal foot
Cable Fence	1 1/4" top rail, 2 7/8" post, 7' o.c. 3 cable—\$7.00 per lineal foot 4 cable—\$7.50 per lineal foot
Gates	54" high, pipe with bracing. \$14 per lineal foot of gate width
Sprinkler System	Hooded Rainbird, including pump. \$100-\$150 per Rainbird, or per double ten barn—20 cows \$5,500 - \$6,500
Roof Structure and Roofing	Pipe supports; wood frame and corrugated iron roofing or steel beams and good steel roofing. \$4.20 - \$5.75 per square foot
Total Area Cost Including All Components	\$15.50 - \$17.30 per square foot



Wash Pen

DAIRY BARNS

DAIRY EQUIPMENT

PARALLEL STALLS (DOUBLE 30)

2' x 30' parallel stall package includes galvanized reels, reel support post, sequencing panels, galvanized rump rail assembly, kick bar support, entrance gate, and hardware. 2' x 30' parallel drive kit includes air controls, air tubing, rump panels, drive guards, air cylinders, hardware, stainless steel curbing, and top rail. Air operated catch lane gates include air control ram, hardware to mount, step ladders with hand rails (front), and miscellaneous hardware.	\$80,000
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VACUUM PUMP

Air vacuum pump with 30 H.P. motor, stand, pulleys, belts, guards, filter assembly, miscellaneous pipe valves, and electrical.	\$9,500
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PIPELINE AND EQUIPMENT

Claws with pulsators and pulsator controller, master control panel, 2 H.P. milk pump, milk receiver, jetter assembly and hose, fresh air kit, C.I.P. sink. Also includes all stainless steel pipelines, elbows, valves, all PVC lines, electrical wiring and panels, and miscellaneous hardware.	\$80,000
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MILK TRANSFER SYSTEM

Control assembly and miscellaneous equipment.	\$4,200
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DETACHERS

Air operated retraction with both manual and automatic operation, indicator lights indicating milking mode and milk flow, air operated shutoff valve/sensor combination, all related electric wiring, air filter, and hardware.	\$69,000
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MILK TANKS (7,000 GALLON)

2 stainless steel 7,000-gallon tanks with agitators and wash pumps. Includes control panel, calibration gauge, temperature recorder with probe assembly, hot milk alarm, miscellaneous piping, and electrical.	\$97,000
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REFRIGERATION SYSTEM

Freon compressor, air condensers, related hardware, pipes, valves, and electrical. Plate cooler with 100 plates and all hardware.	\$43,000
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Above costs include tax and labor

DAIRY BARNS

DAIRY EQUIPMENT

HEAT RECOVERY SYSTEM

Heat recovery system and all hardware.	\$9,500
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HOT WATER SYSTEM

Boiler with insulated 500-gallon storage tank, insulated piping, and electrical.	\$12,500
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SPRINKLER PEN HARDWARE

Pumps, Rainbird, and all related pipelines and miscellaneous hardware.	\$18,000
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AIR COMPRESSOR

10 H.P. air compressor with 120-gallon tank. Includes miscellaneous hardware and electrical.	\$7,500
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ELECTRIC OR AIR CROWD GATE

30 to 50 foot electric gate with track and control kit, motor, panel, and electrical.	\$15,000
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Above costs include tax and labor

Total (Pages 11 & 12) \$445,200

EQUIPMENT ONLY (Including tax and labor)

Double 16' Parallel	Total - \$290,000 to \$300,000
Double 18' Parallel	Total - \$310,000 to \$330,000
Double 20'-24' Herringbone	Total - \$385,000 to \$410,000
Double 30' Parallel	Total - \$420,000 to \$450,000
50-Cow Rotary Barn	Total - \$520,000 to \$540,000

DAIRY BARNS

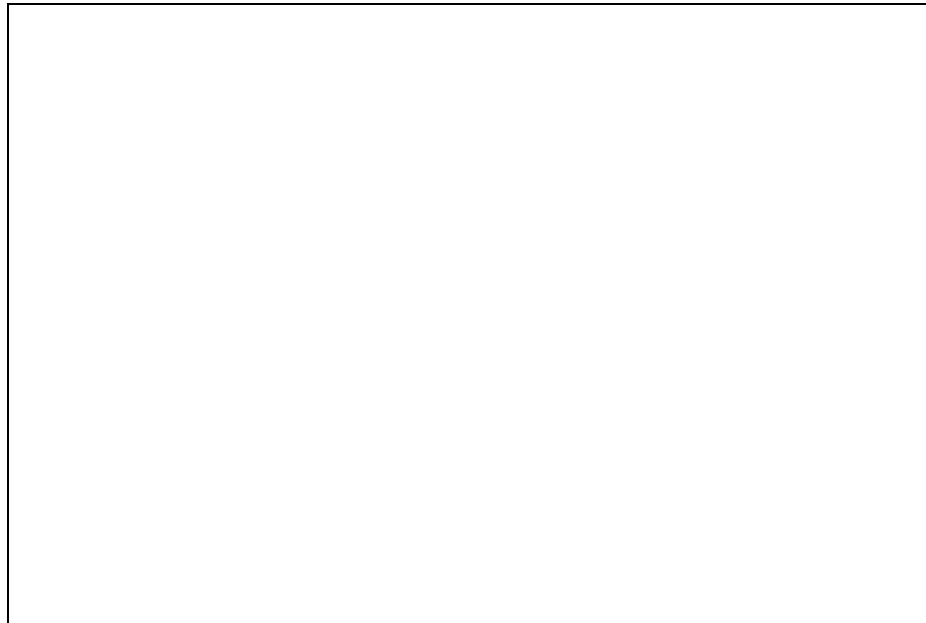
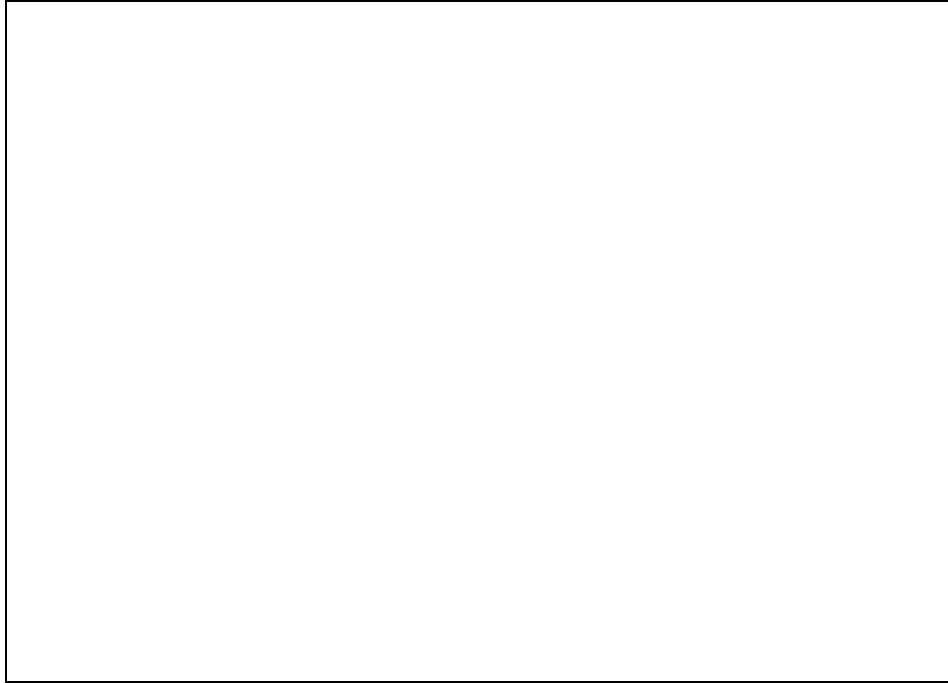
FREESTALL BARN

STANCHIONS, LOOPS, AND FENCES

Foundation	Reinforced concrete
Floors	Sloping concrete with dirt in loop areas. Concrete drive lanes and flush areas.
Walls	Open; poles with steel supports
Roof Structure	Steel frame with steel cover; good quality, with gutters
Electrical	Minimum lighting
Plumbing	Water troughs in each pen with underground flushing
Stanchions	Steel; self locking – 5 hole per 10 feet
Fencing	Cable with steel or wood posts
Capacity	250 to 600 cows; one stanchion per cow
Cost	\$650 to \$750 per cow or \$6.50 to \$7.50 per square foot

DAIRY BARNS

FREESTALL BARN



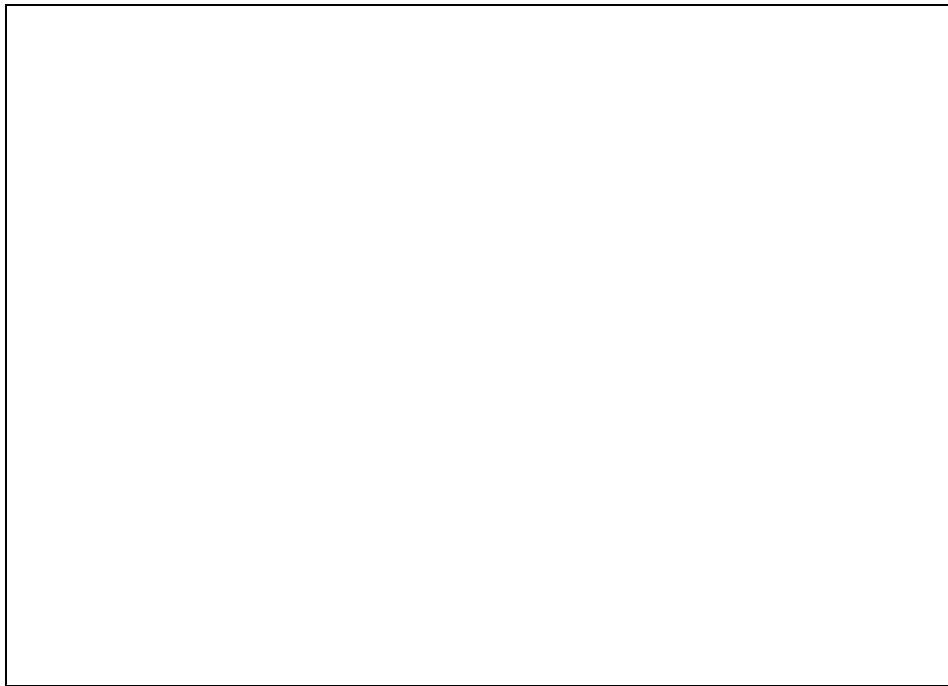
DAIRY BARNS

HOSPITAL BARN

AVERAGE QUALITY

Floors	Concret slab with flush curbs
Walls	Light steel poles, all sides open
Roof	Average wood frame or light metal, with metal cover
Interior	Several small pens with metal pipe fencing
Electrical	Average light fixtures
Plumbing	Concrete water troughs
Cost	\$5.70 to \$6.00 per square foot

Good quality add 20 percent



Hospital Barn – Average Quality



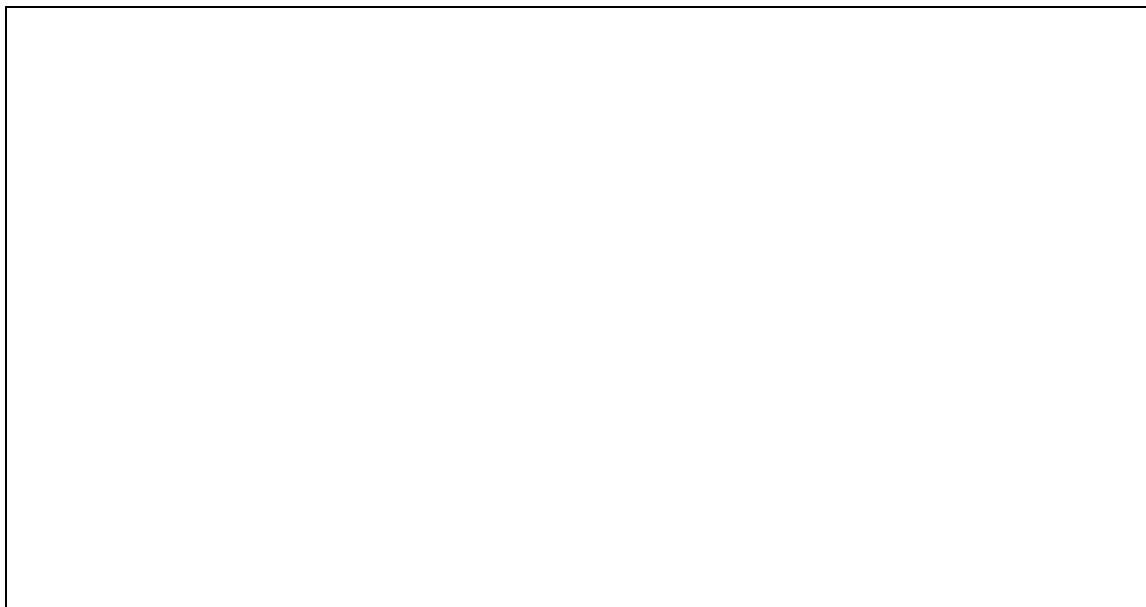
DAIRY BARNS

CORRALS

Components	Cost
Concrete Flatwork Large areas/not reinforced	3½" to 4½"—\$1.60 to \$2.10 per square foot 6"—\$1.80 to \$2.20 per square foot
Curbs	8" x 16"—\$5.40 per lineal foot 8" x 24"—\$7.00 per lineal foot
Cable Fence	2 3/8" top rail, 2 7/8" post—10' o.c. 3 cable—\$7.00 per lineal foot 4 cable—\$7.50 per lineal foot
Concrete Water Tank	\$400 each
Steel Stanchions	\$36.00 to \$40.00 each \$16.00 to \$20.00 per lineal foot
Steel Self-Locking Stanchions	\$38.00 to \$42.00 each \$19.00 to \$21.00 per lineal foot
12" PVC Flush Line	\$9.00 per foot
Sump Pumps	3 HP \$2,600.00 5 HP \$3,500.00
Floating Agitator Pump	75 HP \$15,000 to \$17,000 40 HP \$11,000 to \$12,000
Gates	12' to 16'—\$120 to \$150 each
Loafing Sheds	Wood—\$3.65 - \$4.60 per square foot Steel—\$4.10 - \$5.25 per square foot

COMMODITY BARNS

	Per Square Foot
With Dividers	\$8.25 - \$11.25
Without Dividers	\$7.00 - \$9.00

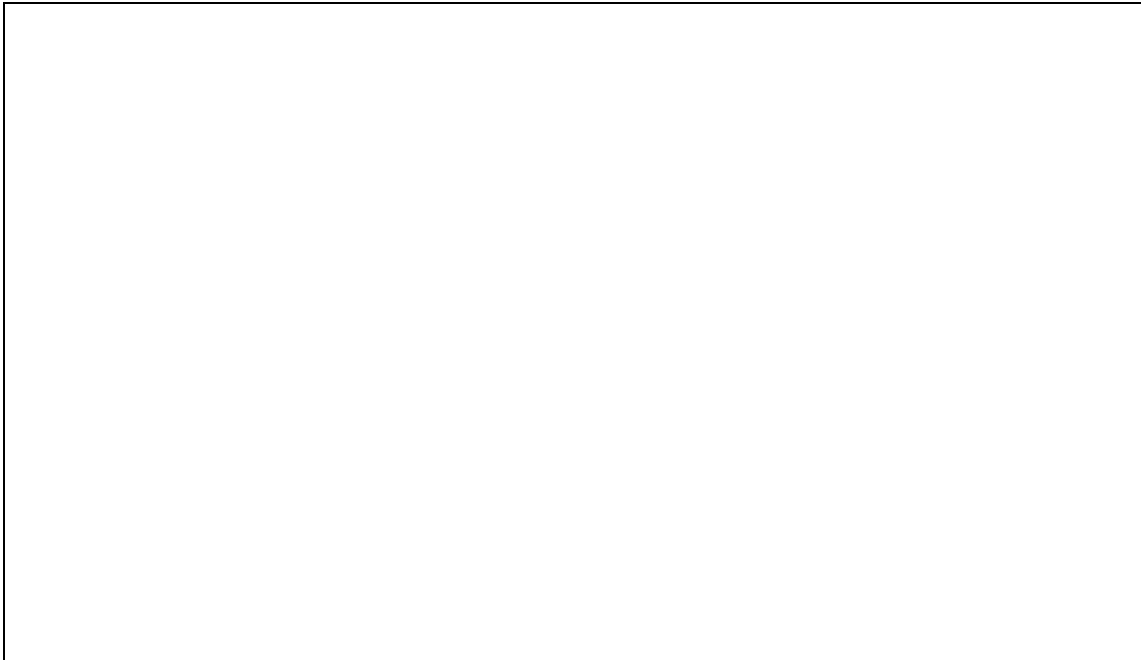
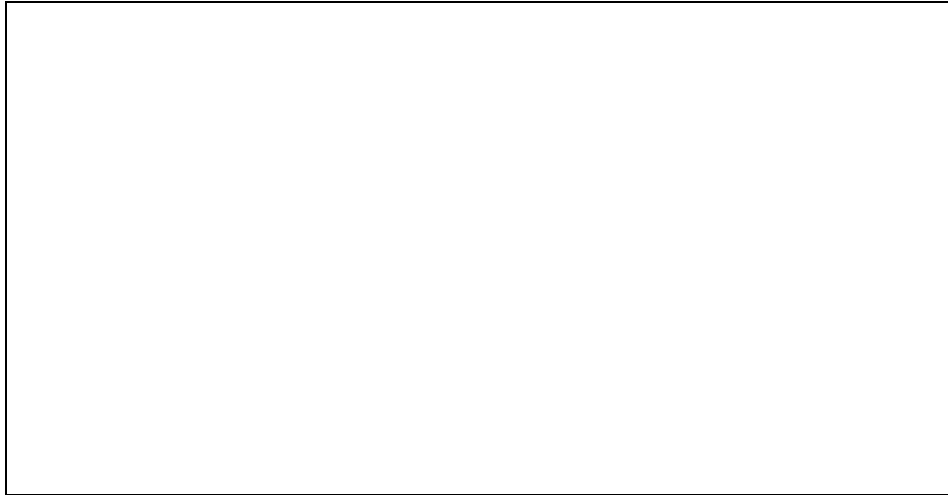


Commodity Barn with Dividers – Average Quality

DAIRY BARNS

HAY BARNS

Floors	Dirt
Walls	Open; used oil field pipe to support roof
Roof	20' eve; low pitch; light wood or steel frame; metal cover
Electrical	None
Plumbing	None
Cost	\$2.45 to \$2.85 per square foot



DAIRY BARNS

MISCELLANEOUS

CURBS

	Per Lineal Foot
8" x 8"	\$3.50
8" x 16"	\$5.40
8" x 20"	\$6.50

CABLE FENCE

	Per Lineal Foot
2 3/8" top rail with 2 7/8" post 10' o.c.	3 cable—\$7.00 4 cable—\$7.50 5 cable—\$8.00

SOLID RAIL FENCE

	Per Lineal Foot
(4) 2 3/8" rails with 2 7/8" post 10' o.c.	\$10.00 - \$11.00

TANKER PAD

	Per Square Foot
6" to 7" rebar reinforced concrete with footings	\$2.20 - \$2.45

WATER TROUGHS

Concrete Water Troughs - 2' x 12'	\$350 to \$375
Concrete Water Troughs - 2' x 16'	\$425 to \$450
Mineral Troughs - 20'	\$125 to \$150

CORRAL SHADES

	Per Square Foot
Pipe poles, wood frame, metal cover	\$1.60 - \$1.75
Pipe poles, steel frame, metal cover	\$1.75 - \$2.00

WATER LINES

2" Water line	\$1.45 per lineal foot
3" Water line	\$1.65 per lineal foot
12" Flush line	\$9.00 per lineal foot
18" Drain line	\$11.40 per lineal foot
Flush valves	\$900 each
Drain boxes	\$1,000 each

DAIRY BARNS

MISCELLANEOUS

SEPTIC TANKS

1,000 – 1,500 gallon with lines	\$3,500 - \$4,000
Cistern - per gallon	\$.55

FEEDLANE STANCHIONS WITH CURB

Galvanized stanchions, 5-hole/10'
Cow-type self-locking with release
with 2 7/8" post in 8" x 16" concrete curb

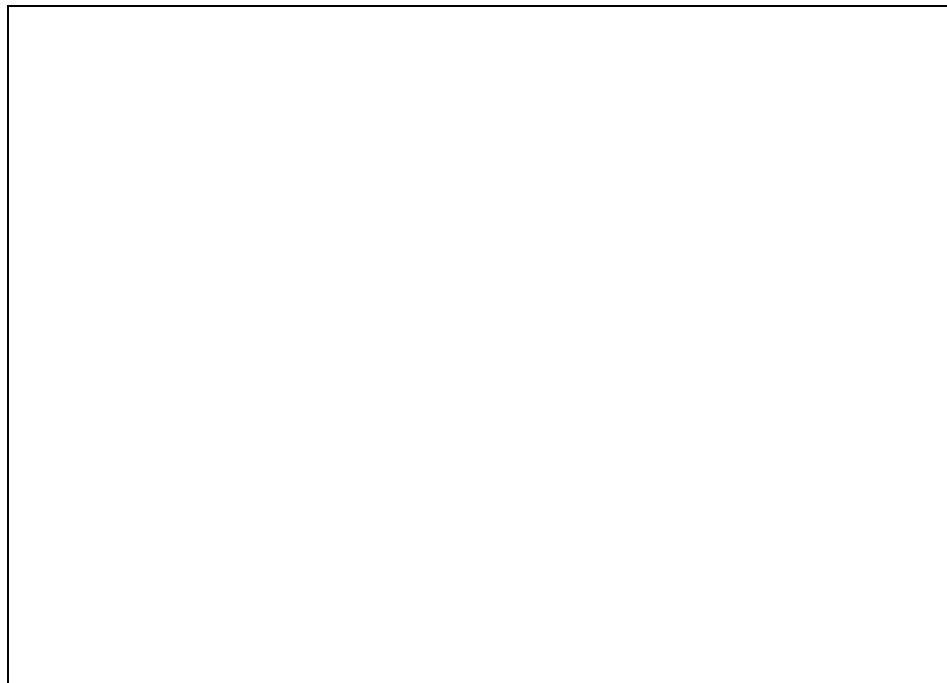
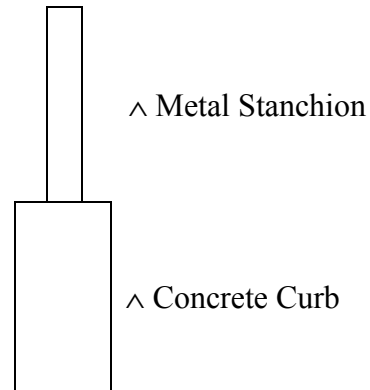
Cost Per Lineal Foot: **\$27.00**

Additional concrete

Drivelane 6" reinforced - **\$1.75 - \$2.10** per sq. ft.

Walklane 4" concrete - **\$1.55 - \$1.75** per sq. ft.

Flush curb 8" x 8" - **\$3.50** per lineal foot



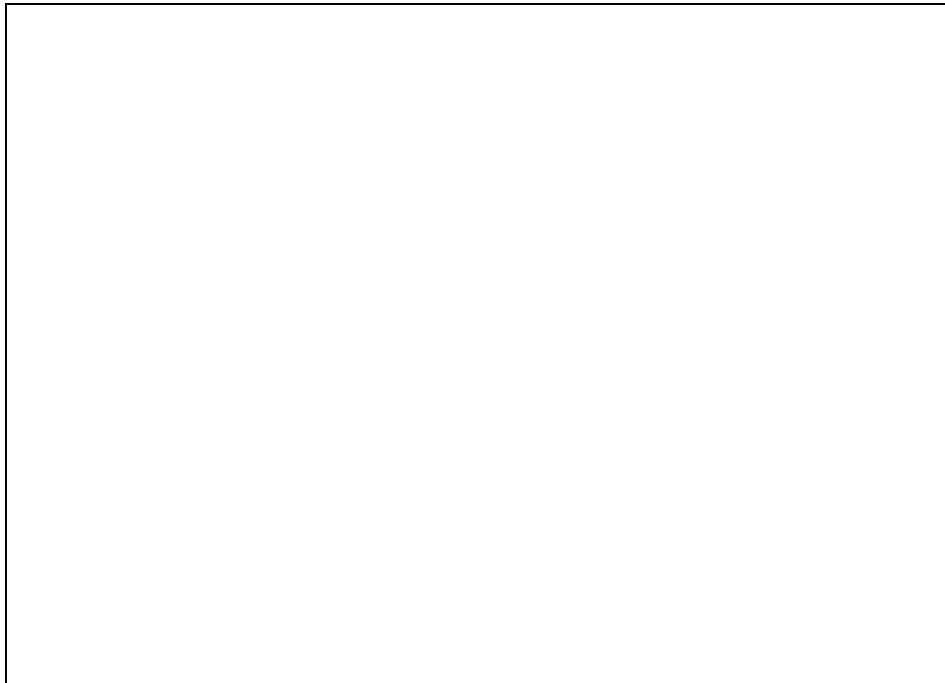
Feedlane Stanchions

DAIRY BARNS

SILAGE PITS

Tilt-up of 6" concrete or 8" reinforced concrete block, 8' high, and enclosed on three sides with 6" concrete slabs.

<u>Size</u>	<u>Price Per Square Foot</u>
75 x 100	\$3.90
100 x 200	\$3.25
100 x 300	\$3.10



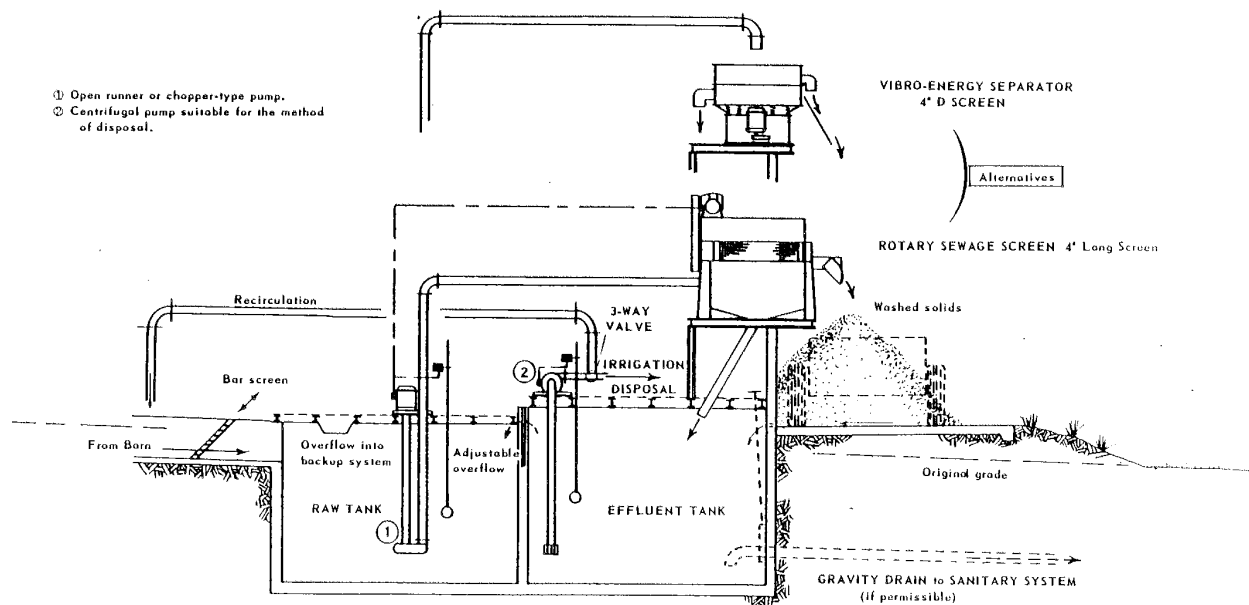
Concrete Silage Slab Only

5 ½" to 6" reinforced with footings - **\$1.90 to \$2.20** with footings

DAIRY BARNS

LIQUID MANURE SYSTEMS

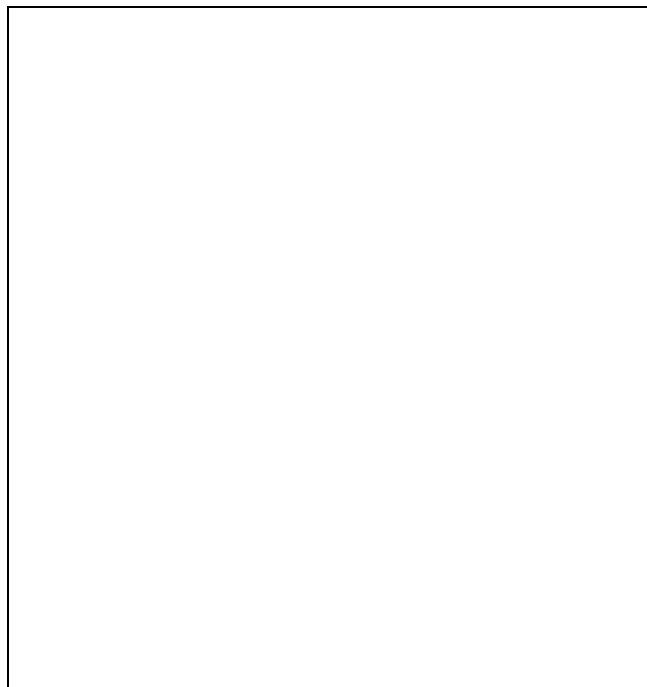
Cost includes tanks, pumps, screens, valves, pipes, sump, and drainage system, but excludes cost of all holding ponds or lagoons. Typically one unit per 800 to 1,000 cows. **\$32,000 - \$40,000**



DAIRY BARNS

PAINTED STEEL BULK FEED TANKS

<u>Components</u>	<u>Cost</u>
4 Ton	\$1,600
9 Ton	2,300
10.5 Ton	2,450
13 Ton	2,700
15 Ton	3,000
20 Ton	3,700
25 Ton	4,100
31 Ton	4,700
34 Ton	4,900



ADDITIVES AND ACCESSORIES

Feeder lines (Per lineal foot)	\$ 6.90
Partition	300.00
Ladder	75.00 -125.00
Augar	165.00 - 200.00

DAIRY BARNS

GRADE "B" BARNS

Use upper end of cost range for Sacramento Valley and north

MILK HOUSE

Foundation	Concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 5 percent of wall area
Interior	Smooth finish plaster
Electrical	Fair fixtures
Plumbing	One wash basin
Square-Foot Cost	\$31.25 to \$38.50 per square foot (including breezeway)

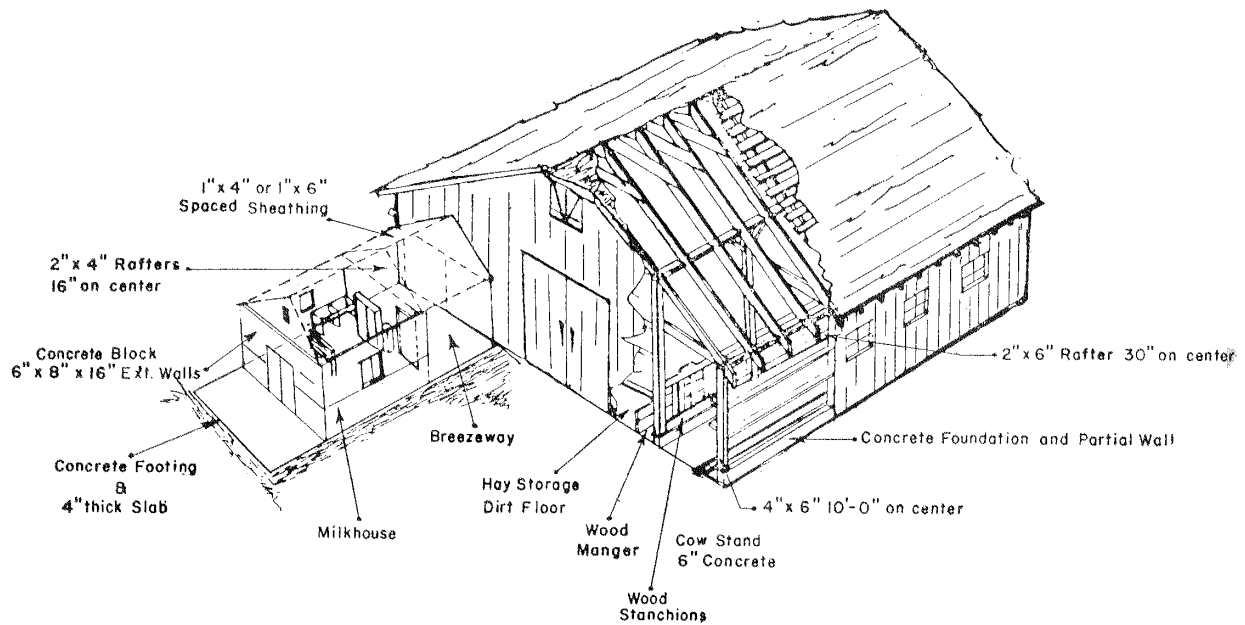
MILKING BARNS

Foundation	Light concrete
Floors	Concrete—cow stands
Walls	Box frame, 4" x 6"—10' on center
Roof	Average wood frame, wood shingles, corrugated iron, or aluminum cover
Windows	Barn sash
Interior	Unfinished
Electrical	None
Plumbing	None
Stanchions	Wood stanchions
Square-Foot Costs	\$13.25 to \$16.50 per square foot

Building costs do not include milking equipment

DAIRY BARNS

GRADE "B" BARNS



TYPICAL GRADE "B" DAIRY BARN

DAIRY BARNS

STANCHION BARNS

High end of range in cost is for Sacramento and Northern California

MILK, WASH, AND EQUIPMENT ROOMS

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 10 percent of wall area
Interior	Smooth finish plaster—cove base
Electrical	Conduit—average fixtures
Plumbing	One wash basin—usual floor drains
Square-Foot Cost	\$33.00 to \$39.50 per square foot (including breezeway)

MILKING BARNS

Foundation	Reinforced concrete
Floors	Concrete—well-formed gutters and mangers
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers
Interior	Smooth plaster 36" high
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
Stanchions	Metal stanchions
Square-Foot Cost	\$24.25 to \$27.75 per square foot

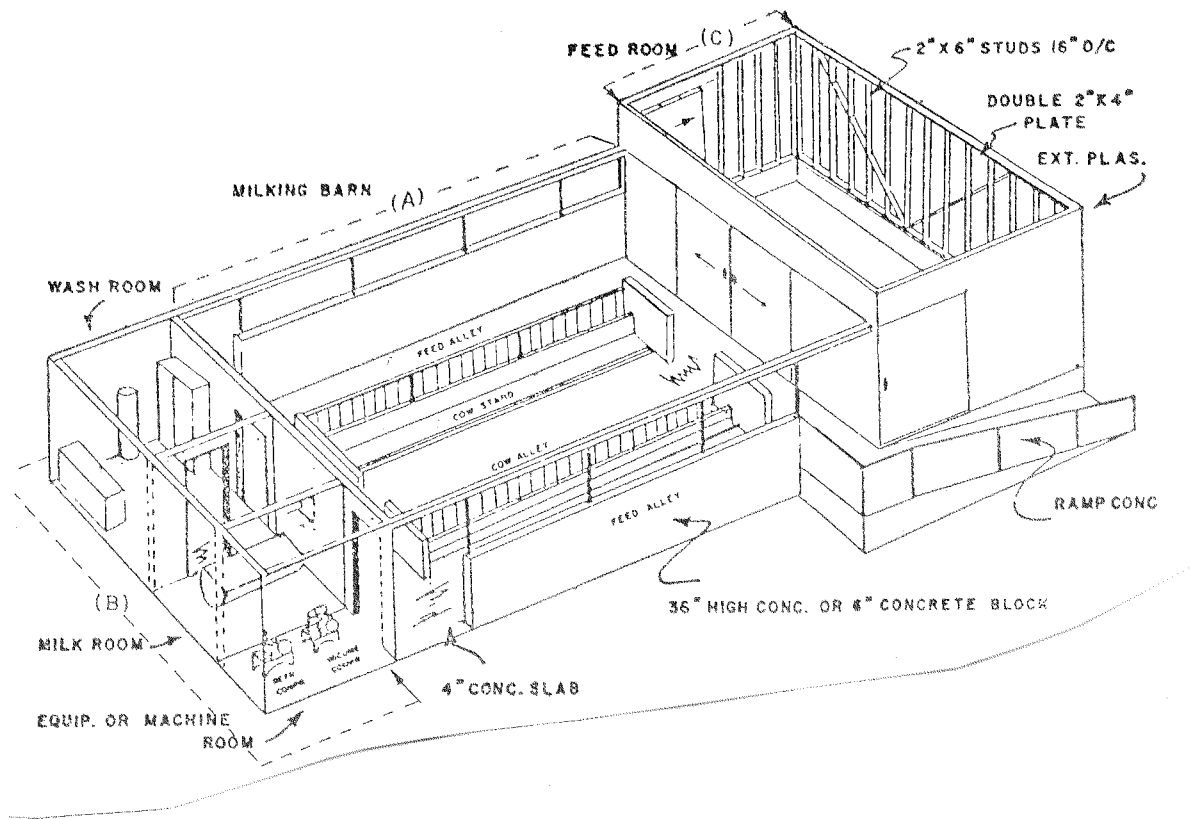
FEED ROOM

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	2" x 4" or 2" x 6"—16" on center framing
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	None
Interior	Unfinished
Electrical	Conduit—average fixtures
Plumbing	None
Square-Foot Cost	\$13.25 to \$22.25 per square feet

Building costs do not include milking equipment

DAIRY BARNS

STANCHION BARNS



Component Parts of This Dairy

- A. Milking Barn
- B. Feed Room
- C. Milk, Wash, and Equipment Rooms

TYPICAL STANCHION BARN

DAIRY BARNS

WALK-THROUGH TYPE

High end of the range in cost is for Sacramento and Northern California

MILK, WASH, AND EQUIPMENT ROOMS

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above or all concrete block
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 10 percent of wall area
Interior	Smooth finish plaster—cove base
Electrical	Conduit—average fixtures
Plumbing	One wash basin—usual floor drains
Square-Foot Cost	\$27.75 to \$30.00 per square foot (including breezeway)

MILKING BARNS

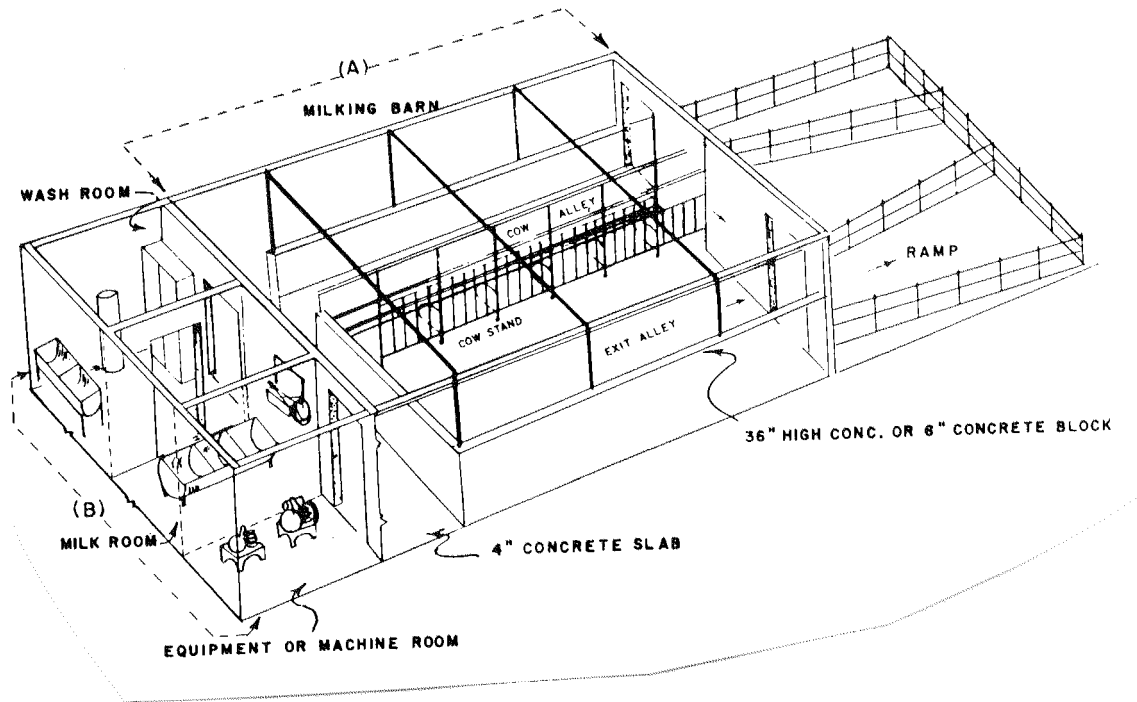
Foundation	Reinforced concrete
Floors	Concrete—well-formed gutters and mangers
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above, or all concrete block
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers
Interior	Smooth plaster 36" high
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
Stanchions	Metal stanchions
Square-Foot Cost	\$26.75 to \$29.00 per square foot

Building costs do not include milking equipment

DAIRY BARNS

WALK-THROUGH TYPE

TYPICAL WALK-THROUGH BARN



Component Parts of This Dairy

- A. Milking Barn
- B. Milk, Wash, and Equipment Rooms

AH 534.30: POULTRY HOUSES

This section contains specifications and costs for various poultry structures and equipment including the following:

- Conventional lay cage houses
- Modern controlled environment houses
- High-rise houses
- Deep-pit houses
- Breeding barn

POULTRY HOUSES

CONVENTIONAL LAY CAGE HOUSES

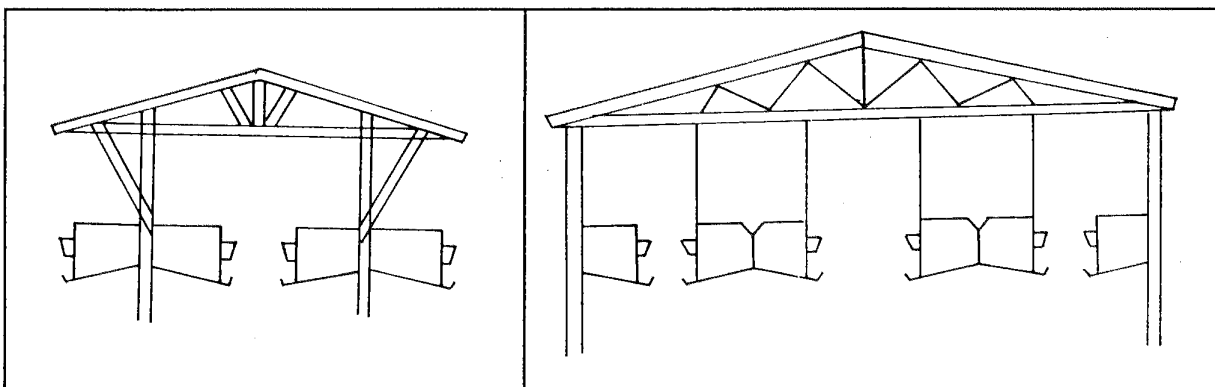
Components	Fair Quality	Average Quality	Good Quality
Foundations	Wood piers	Concrete piers	Thickened slab
Floors	Dirt	Dirt with 4' concrete walkways	2" concrete
Frame	Light wood frame	Average wood frame	Light steel or average wood frame
Roof Cover	Light aluminum or composition	Light aluminum or composition	Aluminum or 28-gauge galvanized steel
Exterior	Wood lath	Vinyl curtains	Plywood
Lighting	Minimum system manual controls	Average system automatic controls	Good system, fluorescent automatic controls
Plumbing	Fair system	Average system	Good system
Insulation	None	None	Roof only
Basic Building Cost Per Square Foot	\$3.10 - \$3.50	\$3.50 - \$4.60	\$5.40 - \$6.50

Basic building costs are for building only and include only those components specified. The cost of all items of equipment such as cages, drinking water systems, fogging systems, feeding systems, egg-gathering systems, heating and cooling systems, etc., must be added to basic building costs to arrive at total cost. See Assessors' Handbook Section 534.30, page 10, for poultry house equipment costs.

POULTRY HOUSES

EQUIPMENT - CONVENTIONAL LAY CAGE HOUSES

Components	Fair Quality House	Average Quality House	Good Quality House	Good Quality House
Cages	12" x 20" single deck	12" x 20" single deck	12" x 20" single deck	12" x 20" double deck
Watering System	Simple "V" trough	Simple "V" trough	Automatic cup system	Automatic cup system
Feeding System	V trough	V trough	V trough	Automatic system
Egg-Gathering System	Manual	Manual	Manual	Manual
Cooling	Simple fogging system	Simple fogging system	Pad and fan system	Pad and fan system
Cost Per Square Foot	\$5.40 to \$7.25	\$6.35 to \$7.95	\$8.40 to \$10.00	\$14.10 to \$16.00
Cost Per Bird	\$5.25 to \$6.85	\$6.35 to \$7.85	\$8.40 to \$10.00	\$13.95 to \$15.75



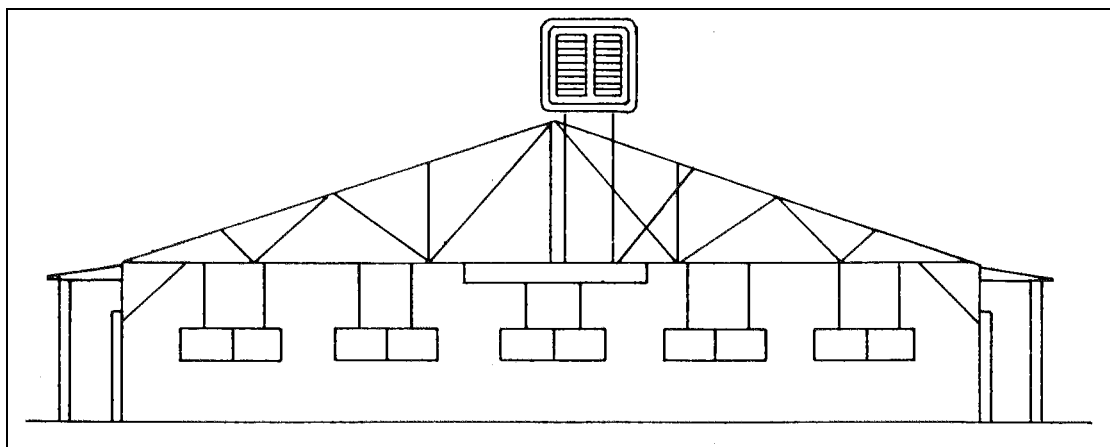
TYPICAL CROSS SECTIONS

POULTRY HOUSES

MODERN CONTROLLED ENVIRONMENT HOUSES

Foundation	Concrete
Floor	3 1/2" concrete slab
Wall Frame	2" x 4"—24" on center or 6" x 6" —10' centers
Roof Frame	Wood trusses with 2" x 4" purlins—24" on center
Exterior	2-rib aluminum or corrugated iron, 28-gauge galvanized steel
Interior	4" fiberglass roll with aluminum foil facing or 3/4" Styrofoam
Lighting	Fluorescent or good automatic incandescent system
Plumbing	Good basic system
Basic Building Cost Per Square Foot	\$8.30 to \$9.95

Basic building costs are for building only and include only those components specified. The cost of all items of equipment such as cages, drinking water systems, fogging systems, feeding systems, egg-gathering systems, heating and cooling systems, etc., must be added to basic building cost to arrive at total cost. See Assessors' Handbook Section 534.30, page 10, for poultry equipment costs.



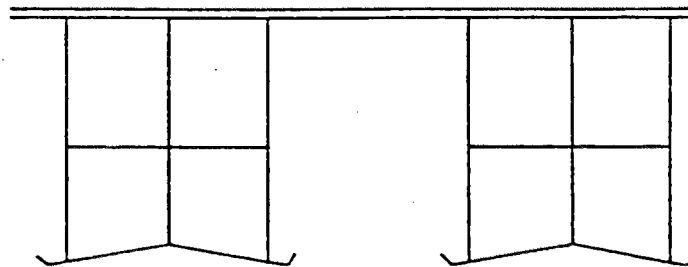
CROSS-SECTIONS - CONTROLLED ENVIRONMENT HOUSE

POULTRY HOUSES

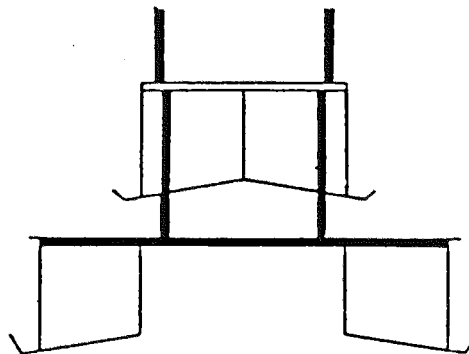
EQUIPMENT - MODERN CONTROLLED ENVIRONMENT HOUSES

Components	Single Deck	Stair Step
Cages	12" x 20" single deck	12" x 20" double deck
Watering System	Automatic cup system	Automatic cup system
Feeding System	Manual	Manual
Egg-Gathering System	Manual	Manual
Cooling	Pad and fan system	Pad and fan system
Heating	None	None
Total Square-Foot Cost	\$18.95 to \$19.95	\$19.95 to \$22.10
Total Cost Per Bird	\$12.60 to \$13.40	\$13.40 to \$14.70

Cost includes building and equipment



SINGLE-DECK CAGE SYSTEM



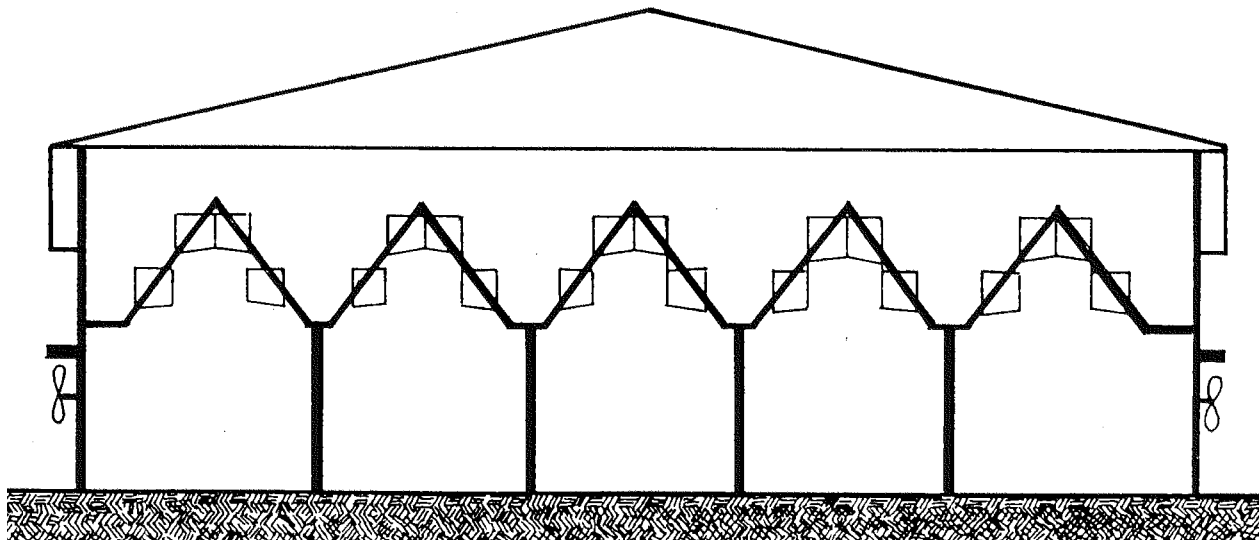
STAIR-STEP CAGE SYSTEM

POULTRY HOUSES

HIGH-RISE HOUSES

Foundation	Concrete piers
Floors	Dirt
Wall Frame	2" x 4"—24" on center
Roof Frame	Wood trusses with 2" x 4" purlins—24" on center
Exterior	28-gauge corrugated galvanized steel
Interior	3/4" Styrofoam
Lighting	Fluorescent or good incandescent
Plumbing	Good basic system
Basic Building Cost Per Bird	\$8.60 to \$10.70

Basic building costs are for building only and include only those components specified. The cost of all items of equipment such as cages, drinking water systems, fogging systems, feeding systems, egg-gathering systems, heating and cooling systems, etc., must be added to basic building cost to arrive at total cost. See Assessors' Handbook Section 534.30, page 10, for poultry equipment costs.



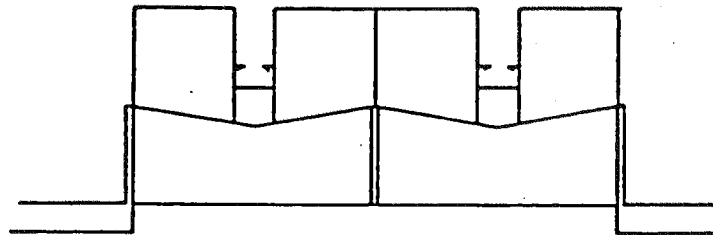
CROSS SECTION - HIGH-RISE HOUSE

POULTRY HOUSES

EQUIPMENT - HIGH-RISE HOUSES

Components	Single Deck	Stair Step
Cages	12" x 20" single deck	12" x 20"
Watering System	Automatic cup system	Automatic cup system
Feeding System	Automatic system	Automatic system
Egg-Gathering System	Automatic system	Automatic system
Cooling	Negative pressure system	Negative pressure system
Heating	None	None
Total Square-Foot Cost	\$16.85 to \$18.95	\$20.50 to \$21.00
Total Cost Per Bird	\$10.50 to \$12.60	\$13.70 to \$14.45

Cost includes building and equipment



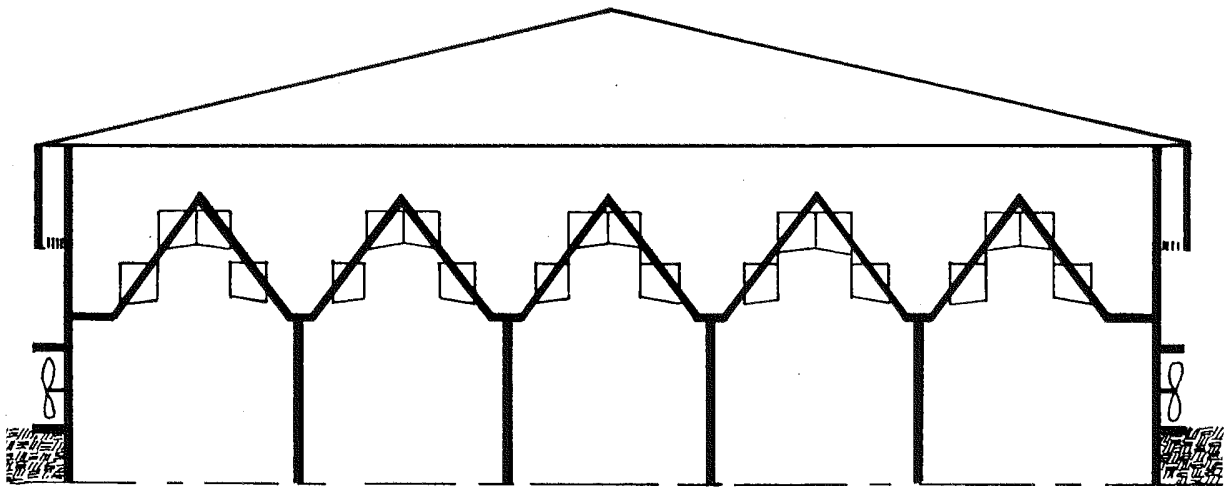
FLAT-DECK CAGE SYSTEM

POULTRY HOUSES

DEEP-PIT HOUSES

Foundation	Concrete piers
Floors	Concrete with waterproof membrane
Wall Frame	2" x 4"—24" on center
Roof Frame	Wood trusses with 2" x 4" purlins—24" on center
Exterior	28-gauge corrugated galvanized steel
Interior	3/4" Styrofoam
Lighting	Fluorescent or good incandescent
Plumbing	Good basic system
Total Square-Foot Cost	\$9.15 to \$10.70

Basic building costs are for building only and include only those components specified. The cost of all items of equipment such as cages, drinking water systems, fogging systems, feeding systems, egg-gathering systems, heating and cooling systems, etc., must be added to basic building cost to arrive at total cost. See Assessors' Handbook Section 534.30, page 10, for poultry equipment costs.



CROSS SECTION - DEEP-PIT HOUSE

POULTRY HOUSES

EQUIPMENT - DEEP-PIT HOUSES

Components	Flat Deck	Stair Step
Cages	12" x 20" single deck	12" x 20"
Watering System	Automatic cup system	Automatic cup system
Feeding System	Automatic system	Automatic system
Egg-Gathering System	Automatic system	Automatic system
Cooling	Negative pressure system	Negative pressure system
Heating	None	None
Total Square-Foot Cost	\$18.90 to \$21.00	\$21.00 to \$25.20
Total Cost Per Bird	\$12.60 to \$14.20	\$14.20 to \$16.85

Cost includes building and equipment

POULTRY HOUSES

EQUIPMENT

Components	Serving One Row of Cages	Serving Two Rows of Cages
Automatic Feeders	\$1.70 per bird	\$.80 per bird
Automatic Egg-Gathering System	\$1.30 per bird	\$.62 per bird
Automatic Water Cup System	\$1.29 per bird \$4.12 per cup	\$.62 per bird \$2.82 per cup
"V" Water Trough	\$.26 per bird	\$.19 per bird
16" Feed Trough	\$.36 per bird	\$.25 per bird
Foggers	PVC	\$1.03 per linear foot
Roof Sprinklers		\$1.96 per linear foot
Evaporative Coolers		\$900 each \$1.00 per square foot of building
Fans 30" 36" 48"		\$500 each \$675 each \$750 each
Negative Pressure Air square Conditioning System		\$.95 to \$1.05 per foot of building area
Cooling Pads in Wall		\$.62 per square foot of surface area
Heating Systems		\$1,240 per ton
Cages 12" x 20" or 18"		\$6.45 each \$1.60 per bird

To be added to basic building costs

POULTRY HOUSES

POULTRY HOUSE

Size: 50' x 450'—22,500 square feet
No foundation
Box construction, 4" x 6" posts on 10' centers
Plywood ends
Chicken wire siding with curtains
2" x 8" roof rafters on 10' centers
Roof cover—galvanized steel
Dirt floors
Plumbing and electric systems—extra

Cost: \$2.80 per square foot

Same structure without chicken wire sides and curtain

Cost: \$2.50 per square foot

BREEDING BARN

Size: 40' x 360'—14,400 square feet
Concrete foundation
Box construction, 6" x 6" posts on 10' centers—8' high
Exterior: wood siding on the ends and 4' on sides—4' chicken wires on sides, and curtains
2" x 8" roof rafters on 10' centers
Roof cover: 28-gauge galvanized steel
Concrete floors
Workroom on one end, 10' x 40'
Plumbing and electrical systems—extra

Cost: \$3.90 per square foot

POULTRY HOUSES

PICTURES

BREEDING OR BROILER BARN

AH:534.61: IRRIGATION SYSTEMS

The following costs of irrigation system components have been tabulated from information gathered, for the most part, in the San Joaquin and Sacramento Valleys. Costs have been collected for only the more widely used components. Many areas will have types of equipment not usually found in other locations. These costs should be checked locally.

IRRIGATION SYSTEMS

CONCRETE PIPE—INSTALLED

Size in Inches	Cost Installed Per Lineal Foot		Vertical Stand Pipe Including Base Installed Cost Per Foot of Height	
	Fresno Area	Sacramento North	Fresno Area	Sacramento North
8	\$5.90	\$6.00	\$12.75	\$13.25
10	6.10	6.15	15.30	16.30
12	6.60	6.70	16.30	17.50
14	7.00	7.30	19.40	20.50
16	7.65	8.30	24.50	25.50
18	9.00	9.35	33.15	34.50
20	10.45	10.85	35.00	38.50
24	15.00	16.00	53.00	60.00
30	38.00		94.00	99.00
36			107.00	117.00
42			153.00	163.00
48			209.00	220.00

The above prices are for installations over 700 feet in length. Adjust the above prices for installations less than 700 feet by the following amount.

Length of Pipe

Add to All Sizes

Up to 100'	\$4.00 per foot
100' to 200'	3.50 per foot
200' to 300'	3.00 per foot
300' to 400'	2.10 per foot
400' to 500'	1.90 per foot
500' to 600'	1.25 per foot
600' to 700'	.55 per foot

IRRIGATION SYSTEMS

PRESSURE BOXES (Reinforced concrete with capped top)

Size	Price Per Lineal Foot of Height
24"	\$310
30"	375
36"	470

STAND PIPE INCLUDING THE BASE

Size	6'	9'	12'	15'	18'
24"	\$320	\$ 477	\$ 636	\$ 796	\$ 867
30"	525	750	970	1,198	1,422
36"	587	837	1,086	1,340	1,590
42"	683	980	1,270	1,566	1,860
48"	900	1,285	1,672	2,090	2,380

VENT PIPE—PLASTIC

Size	9' Height Limit
2"	\$5.50 per foot
3"	8.00 per foot
4"	10.00 per foot

VENT PIPE—STEEL

Size	9' Height Limit
2"	\$8.00 per foot
4"	9.50 per foot
6"	13.00 per foot
8"	17.00 per foot
10"	21.00 per foot
12"	34.00 per foot

ADD HOOK-UP (When new concrete pipe is connected to old concrete pipe, add the following)

Size	Add
8", 10", and 12"	\$120
14", 16", and 18"	150
20" and 24"	175

IRRIGATION SYSTEMS

P.V.C. PIPE

Cost includes components and installation, but not hook-up to pump. As pressure requirements rise, the pipe becomes more costly.

P.V.C. PIPE—INSTALLED (PER LINEAL FOOT)

Size	Class 63 Low Head (Flood)	100 P S I (Sprinkler)
6"	\$2.73	\$3.95
8"	3.40	4.35
10"	4.35	5.50
12"	5.65	7.00
15"	7.90	9.20
18"	8.70	-

P.V.C. hook-up to pump—includes relief valves, check valves, dresser couplings, elbows, and labor.

ADD HOOK-UP

Size	Cost
6"	\$600
8"	680
10"	1,075
12"	1,550

VALVE, SADDLE, AND RISER (FOR SURFACE LATERALS)

Size	Sprinkler	Flood
4"	\$ 75	\$ 80
8"	-	139
10"	-	170
12"	-	220
14"	-	290

IRRIGATION SYSTEMS

ALUMINUM PIPE

Aluminum pipe costs include sales tax, but exclude installation costs due to their portable nature.

Main Lines Per Linear Foot	Diameter			
	6"	8"	10"	12"
Ring Lock Type				
40' joints <u>without</u> valve	\$4.00	\$5.35	\$6.20	\$7.30
40' joints <u>with</u> valve	4.50	6.30	7.35	8.70
Latch Type	3"	4"	6"	
30' joints <u>without</u> valve	\$1.22	\$2.10	\$3.00	

SPRINKLER LINES

18" Risers—30' lengths 3"—\$1.65 per linear foot 4"—\$2.30 per linear foot

FITTINGS

Valve Openers		End Plugs		Elbows	
Size	Cost	Size	Cost	Size	Cost
3"	\$70	6"	\$40	6"	\$ 76
4"	71	8"	50	8"	100
		10"	75	10"	140

IRRIGATION SYSTEMS

IRRIGATION VALVES

Flood valves are set near the top or flush on top of a concrete pipe riser. Several types are in general use, i.e., Yakima and Alfalfa. They are made with either a solid arch or a removable arch. The removable arch type is more expensive, but it allows for replacement of the arch without complete valve removal when breakage occurs. The solid arch is usually found to be a Yakima and the removable arch is an Alfalfa.

FLOOD VALVES

Size in Inches	Solid Arch Yakima	Size in Inches	Alfalfa
3 x 8	\$ 62		
4 x 8	65	8 x 8	\$ 123
5 x 8	70	10 x 10	153
6 x 10	92	12 x 12	184
8 x 12	110	14 x 14	213
10 x 14	153	16 x 16	288
12 x 16	185	18 x 18	385
14 x 18	226	20 x 20	480
16 x 20	350	24 x 24	710
18 x 20	380		
20 x 20	452		

OVERFLOW VALVES

Size in Inches	Cost Installed
3 x 8	\$ 55
3 1/2 x 8	55
4 x 8	57
5 x 8	65
5 x 10	65
6 x 10	88
6 1/2 x 10	91
8 x 12	105
10 x 14	146
12 x 16	188
14 x 18	236
16 x 20	340
18 x 20	415
20 x 24	525

IRRIGATION SYSTEMS

IRRIGATION VALVES

The orchard valve is a solid arch set down in a riser. Although it is generally used in orchards, it may also be found in row crops and pastures.

ORCHARD VALVE

Valve Size	Riser Size	Cost
3 1/2"	8"	\$ 53
4"	8"	59
5"	8"	67
6"	10"	87
6 1/2"	10"	89
8"	12"	103
10"	14"	143
12"	16"	185
14"	18"	215
16"	20"	323
18"	21"	405
20"	24"	492

IRRIGATION SYSTEMS

IRRIGATION VALVES

The vineyard valve is a modification of the orchard valve. The riser is pierced with two or more small galvanized tubes which have small sliding galvanized gates. This arrangement allows a choice of direction and volume of water flow. This valve is found mainly in the Central San Joaquin Valley.

VINEYARD VALVE

Valve Size	Riser Size	Number of Gates	Gate Size	Cost Installed
3 1/2"	8"	2	2"	\$63
3 1/2"	8"	2	2 1/2"	65
3 1/2"	8"	2	3"	67
3 1/2"	8"	3	2"	67
3 1/2"	10"	2	2"	65
3 1/2"	10"	2	2 1/2"	68
3 1/2"	10"	2	3"	68
4"	8"	2	2"	65
4"	8"	2	2 1/2"	67
4"	8"	2	3"	69
4"	10"	2	2"	68
4"	10"	2	2 1/2"	70
4"	10"	2	3"	72
4"	10"	3	2"	72
4"	10"	4	2"	72
5"	10"	4	2"	83
5"	12"	2	3"	82
6"	10"	2	3"	76
6"	10"	4	3"	84
6"	12"	2	3"	90
6"	12"	2	4"	94

IRRIGATION SYSTEMS

IRRIGATION VALVES

Gate valves have different designs depending on the use. The canal gate is for general low-pressure uses as canal discharges, pressure pipelines, etc. The screw-pressure gate is a high-pressure gate valve used for reservoirs, etc. The hub-end gate is designed for use in pipelines.

GATE VALVES

Size in Inches	Screw Pressure	Canal Gate	Hub-End Gate	Clamp Gate	Baxter Gate	Galvanized Gate	*Brass Slide Gate	*Cast Iron Gate
6						\$68		
8	\$445		\$740	\$330		96		\$105
10	500	\$ 530	900	380		105	\$315	130
12	564	580	1,050	420	\$880	120	340	145
14	730	680	1,300	555		150	350	210
16	1,175	800	1,600	690	1,075	175	420	315
18	1,570	930	2,000			190	550	
20	1,630	1,100	2,440			215	630	
24	2,100	1,240				290	760	

* Brass-Slide and Cast-Iron Gates are seldom used.

Capped riser irrigation systems are generally found in old orange groves. The galvanized gates are diamond shaped.

CAPPED RISERS

Size	Number of Gates	Size of Gates	Installed Cost
8"	2	2"	\$42
8"	3	2"	50
8"	4	1"	48

BALL VENTS

Size	Installed on Line
2"	\$ 80.00
3"	150.00
4"	198.00

IRRIGATION SYSTEMS

PERMANENT IRRIGATION SYSTEM

The larger set-ups are at lower end of range

SPRINKLERS— "SOLID SET"—UNDER TREES

Type	Cost Per Acre
Manual System	\$ 750 to 1,100
Automatic System	850 to 1,200
Frost Protection System	900 to 1,400
Automatic system with frost protection	1,200 to 1,500

P.V.C. underground lines, 12" risers, impulse heads, sand filter

SPRINKLERS—"SOLID SET"—OVER VINES

Type	Cost Per Acre
Manual System	\$ 800 to \$1,100
Automatic System	\$ 900 to \$1,200
Frost Protection System	\$1,100 to \$1,400
Automatic system with frost protection	\$1,600 to \$2,400

P.V.C. underground lines, 6" risers, impulse heads, sand filter

DRIP SYSTEM—ORCHARD

Type	Cost Per Acre
New planting (1 to 4 emitters per tree)	\$ 750 to \$1,000
Mature orchard (4 emitters per tree)	\$ 700 to \$1,100

DRIP SYSTEM—VINEYARD

Type	Cost Per Acre	Total Cost
Ratio of cost—70 percent above ground, 30 percent below ground, add	\$950 to \$1,400	
Elaborate sand filters (for dirty water-aqueduct and river water), add	\$100 to \$120	
Fertilizer application equipment, add		\$500 to \$600
When proportion pumps are used, add		\$1,350 to \$2,200

The linear overhead sprinkler system is used on a level parcel usually a one-half section of land. A concrete ditch runs through the parcel as a water supply. This type of irrigation system costs between **\$650 to \$750** per acre. The linear drive machine costs **\$120,000 - \$140,000**.

IRRIGATION SYSTEMS

PERMANENT IRRIGATION SYSTEM

PULL HOSE SYSTEM

Type	Cost Per Acre
Plus pump and filter	\$550 to \$700

CENTER PIVOT SPRINKLER—Including concrete base

Size	Cost Each
160 acres (130 acres net)	\$35,000 to \$39,000

CONCRETE PIPE POURED IN-PLACE¹

Size in Inches	Cost Per Linear Foot
30	\$12.50
36	13.50
42	17.80
48	21.00

Air-Vents	10"—\$10.00 12"—\$12.00 14"—\$14.00 per foot
Concrete Structures	\$400 per cubic yard
Control Gates	\$200
Hook-up and Connections	Between no charge and \$240

CRIBBINGS

Size in Inches	Cost Per Linear Foot
24	\$125
30	170
36	180

The concrete riser above the valve is cut in half to direct the flow of water

¹ This pipe is installed using a two-pour system. Monolithic pipe is installed by a single-pour system. Monolithic pipe is two to three times greater in cost.

IRRIGATION SYSTEMS

CONCRETE DITCH COSTS

Costs are for one-half to one mile runs. Shorter runs are a little higher.

<u>Bottom</u>	<u>Depth</u>	<u>Cost Per Foot</u>
1'	16"	\$6.20
1'	18"	6.40
1'	20"	6.80
1'	22"	7.20
1'	24"	7.40
1'	26"	7.75
1'	28"	7.95
1'	30"	8.40
2'	24"	10.95
2'	27"	11.25
2'	30"	12.45
2'	34"	13.50
2'	36"	14.00
2'	38"	14.55
2'	40"	15.00
2'	42"	15.55
2'	44"	16.60
2'	46"	17.10
2'	48"	18.60

The above costs do not include end gates and turn out gates. They range from **\$100 to \$125** each (three joints 12" x 14" in diameter). Check gates cost **\$325**.

The above prices do include the land shaping.

IRRIGATION SYSTEMS

ALFALFA VALVE

YAKIMA VALVE

PRESSURE SLIDE GATE

CANAL GATE

HUB END GATE

IRRIGATION SYSTEMS

PICTURES

IN-LINE OVERHEAD SPRINKLER SYSTEM

IRRIGATION SYSTEMS

PICTURES

PIVOTAL OVERHEAD SPRINKLER

AH 534.62: PUMPS

This section contains specifications and costs for various pumps used with irrigation systems, including:

- Turbine pumps
- Diesel powered pumps
- Wells
- Windmills

PUMPS

SAN JOAQUIN VALLEY BASE TURBINE 3-PHASE FREE FLOW DISCHARGE

1,800 RPM, 5 to 350 HP installed, including pump complete in place with normal stages, power pole, pads, and control panel. Well and casing excluded.

HP	Depth of Setting											
	40'	60'	80'	100'	120'	140'	160'	180'	200'	220'	260'	300'
5	5,370	5,437	6,186	6,569	7,573							
8	5,437	5,549	6,441	6,865	8,211	8,833	9,787	10,481	11,990			
10	5,681	6,441	7,191	7,823	8,583	8,956	9,965	10,736	11,485	12,235	13,760	
15	6,441	7,074	7,823	8,456	8,833	9,098	10,220	11,047	11,990	12,748	14,510	15,902
20	7,834	8,323	8,956	9,343	9,782	10,220	10,736	11,230	12,123	13,127	14,647	16,034
25	8,323	8,583	9,343	10,353	10,736	11,102	11,745	12,873	13,760	14,510	14,897	16,407
30	9,343	9,838	10,220	10,858	11,363	11,990	12,628	13,255	13,882	14,647	15,785	17,044
40	10,353	10,598	10,858	11,485	12,862	13,627	14,392	15,152	15,902	16,407	18,299	19,569
50	10,736	11,990	13,255	13,882	14,515	15,152	15,785	16,407	18,299	18,936	21,451	22,715
60		13,877	14,510	15,785	16,406	17,044	17,672	18,299	19,569	21,456	23,980	25,245
75		15,785	16,406	18,299	18,936	19,569	20,201	21,451	22,715	23,980	27,780	29,029
100		16,416	18,299	19,569	21,451	22,726	23,990	25,245	25,877	27,142	29,029	30,294
125		19,569	21,451	22,715	23,980	25,245	27,142	28,407	30,488	32,824	35,353	36,608
150			22,715	23,980	25,250	27,142	29,029	30,294	31,559	34,711	37,873	39,137
200			23,980	25,250	27,780	31,559	32,824	35,353	36,608	39,137	42,917	44,181
250				32,824	36,607	37,873	39,137	40,420	42,917	45,446	46,706	50,495
300					42,917	44,181	45,446	47,981	50,495	51,760	54,279	55,549
350						53,025	54,279	55,549	58,069	59,323	60,598	63,118

Note: The appraiser must know the horsepower and depth of setting in order to estimate the RCN from the chart.

Turbine pumps are more commonly used than submersibles, primarily due to accessibility of the pump for maintenance purposes. Submersibles tend to exceed the cost of turbines at high settings and tend to be less costly at lower settings.

Add 10 percent to the above RCN factors for irrigated sprinkler systems.

PUMPS

DIESEL POWERED DEEP WELL IRRIGATION PUMPS

The complete installation costs are divided into three parts: engines, gear heads, and below ground assembly. Costs are based on data from Fresno to the Southern San Joaquin Valley.

DIESEL ENGINES NEW (Includes Tax and Delivery)

HP	Cost
75	\$7,300 - \$9,800
100	\$9,800 - \$13,000
150	\$12,000 - \$15,600
200	\$15,000 - \$18,600
250	\$18,700 - \$21,700
300	\$20,800 - \$26,000

Reconditioned engines deduct 25 to 30 percent

GEAR HEADS

HP	DRIVE	SHAFT	FLANGES (2)	GUARD	LABOR	TOTAL
100	\$1,890	\$560	\$310	\$155	\$1,530	\$4,440
125	\$2,040	\$660	\$410	\$155	\$1,530	\$4,800
150	\$2,500	\$660	\$410	\$155	\$1,530	\$5,250
200	\$3,060	\$660	\$410	\$155	\$1,530	\$5,810
250	\$5,100	\$1,020	\$510	\$155	\$1,530	\$8,160
300	\$5,610	\$1,020	\$510	\$155	\$1,530	\$8,820
350	\$6,630	\$1,020	\$510	\$155	\$1,530	\$9,840
400	\$8,160	\$1,130	\$510	\$155	\$1,530	\$11,470

BELOW GROUND ASSEMBLY (Includes Column—Tube and Shaft and Bowls)

Gear Head HP	200' Lift	300' Lift	400' Lift	500' Lift	600' Lift	700' Lift
100	\$15,300	\$18,360				
125	\$20,400	\$22,950	\$25,500			
150	\$21,620	\$25,500	\$26,720			
200		\$27,540	\$29,070	\$31,110		
250			\$31,010	\$33,050	\$35,090	
300				\$34,370	\$36,400	\$38,450
400				\$35,900	\$37,940	\$41,000

Add to engine and gear head figures.

RULE OF THUMB: The horsepower of the gear head will require an engine with bulk or gross horsepower of about 1-1/2 times the size of the gear head, i.e., 200 HP gear head x 1.5 = 300 HP engine. 300 bulk HP engine x 80 percent = continuous HP x 80 percent = 192 HP to gear head.

NOTE: Costs do not include fuel tanks or fuel tank saddles.

PUMPS

PICTURES

TURBINE PUMP

DIESEL ENGINE WITH GEAR HEAD DRIVE

PUMPS

DISCHARGE HEADS

<u>Discharge Size</u>	<u>Price Includes Head, Solenoid, Oiler, Column, Nipple, and Flange</u>
4 x 12	\$1,225
6 x 12	1,475
8 x 12	1,530
8 x 16 1/2	1,890
10 x 20	2,350

COLUMN ASSEMBLY (In 20' lengths)

Column	Tube	Shaft	Price Per
4"	1 1/2"	1"	\$35.00
6"	2"	1 1/4"	51.00
8"	2 1/2"	1 1/2"	68.00
10"	2 1/2"	1 11/16"	83.00
10"	3"	1 15/16"	98.00
12"	3"	1 15/16"	118.00
12"	3 1/2"	2 1/4"	134.00

NOTE: Column assembly in 10' lengths—add 10 percent.

Reduce the above costs 15 percent for the San Joaquin Valley.

PUMPS

BOWLS

Stages	8"	10"	12"	14"	16"
1	\$1,270	\$1,500	\$1,965	\$2,890	\$4,100
2	1,330	1,850	2,425	3,525	4,620
3	1,620	2,195	3,120	4,275	7,160
4	1,965	2,655	3,640	4,965	7,275
5	2,425	3,000	4,390	6,065	9,010
6	2,540	3,525	4,850	7,045	10,165
7	2,775	3,930	5,430	8,030	11,550
8	3,000	4,390	6,065	9,010	12,705
9	3,410	4,850	6,815	9,700	14,205
10	3,640	5,085	7,275	10,685	15,535
11	3,985	5,545	7,910		
12	4,390	6,065	8,490		
13	4,620	6,525			
14	4,850	6,930			
15	5,315	7,275			

Reduce the above costs 10 percent for the San Joaquin Valley

5 HP	to	7 1/2 HP	Use 8" bowls
10 HP	to	20 HP	Use 10" bowls
25 HP	to	60 HP	Use 12" bowls
75 HP	to	350 HP	Use 14" bowls up to 150' setting
8" bowls—25' per stage (100' = 4 stages)			
10" bowls—35' per stage (100' = 3 stages)			
12" bowls—50' per stage (100' = 2 stages)			
14" bowls—60' per stage (100' = 2 stages)			

PUMPS

COLUMN PIPE

Size	10' Lengths	20' Lengths
6"	\$170	\$215
8"	230	385
10"	310	510

Reduce the above costs 10 percent for the San Joaquin Valley.

TUBE AND SHAFT

1 1/2" x 1"	\$135	\$185
2" x 1 1/4"	195	330
2 1/2" x 1 1/2"	245	460
2 1/2" x 1 11/16"	280	535
3" x 1 15/16"	395	715

Reduce the above costs 10 percent for the San Joaquin Valley.

5 HP to 40 HP	Use 1 1/2" x 1"
50 HP to 75 HP	Use 2" x 1 1/4"
100 HP to 150 HP	Use 2 1/2" x 1 1/2"
5 HP to 15 HP	Use 6" column
20 HP to 40 HP	Use 8" column to 100' then use 6"

PUMPS

SUBMERSIBLE

Costs are based on 3-phase, 3,600 RPM pump in a 6" to 18" well. They include normal stages, check valve, power pole, control panel, and installation labor at 0' setting. Costs are relative to settings—low for shallow, high for deep—for installations typical to the horsepower. Add riser pipe and wire costs per linear foot to setting depth. Add well and casing.

HP	Motor, Pump, and Stages	Column Assembly	Recommended Well Size
5	2,410 to 2,700	\$5.50 to \$7.40	8"
7 ½	2,750 to 3,100	\$5.50 to \$11.20	8"
10	3,100 to 3,550	\$5.50 to \$12.20	8" to 10"
15	3,620 to 4,250	\$6.90 to \$13.50	10" to 12"
20	4,450 to 4,950	\$8.00 to \$14.30	12"
25	4,700 to 5,380	\$10.00 to \$14.40	12"
30	6,420 to 7,000	\$10.00 to \$15.65	12"

High capacity—1,760 RPM (little used) for deep wells. Cost includes pump end and one stage, control panel, power pole, tax, and installation labor.

HP	Motor and Pump	Stages	Riser Pipe and Wire Per Foot	Recommended Well Size
40	\$10,000 +	\$340 per stage	\$18.55	12"
50	11,000 +	410 per stage	23.20	14"
60	11,800 +	450 per stage	23.20	14"
75	12,500 +	460 per stage	23.20	14"
100	13,400 +	480 per stage	23.20	14"

TAIL WATER PUMPS

HP	Cost	HP	Cost
2	\$3,215	20	\$6,250
3	3,400	25	6,680
5	3,700	30	7,000
7 ½	4,000	40	7,800
10	4,350	50	8,600
15	5,570		

PUMPS

WELL COSTS

REVERSE ROTARY DRILLING (Includes Casing, Gravel Pack, Cement Seal)

Size	To 700'	Over 700'	Over 1,000'
6" 12 ga.	\$21.00	\$35.00	
6" 10 ga.	25.00		
8" 12 ga.	24.00		
8" 10 ga.	28.00		
8" 3/16 in.	32.00	38.00	
10" 10 ga.	37.00		
10" 3/16 in.	40.00		
10" 1/4 in.	44.00	54.00	
12" 10 ga.	41.00		
12" 3/16 in.	46.00		
12" 1/4 in.	49.00	61.00	\$83.00
14" 3/16 in.	55.00		
14" 1/4 in.	60.00	74.00	
14" 5/16 in.	65.00	79.50	95.00
16" 3/16 in.	60.00		
16" 1/4 in.	66.00		
16" 5/16 in.	71.00	87.00	104.50
18" 3/16 in.	63.00		
18" 1/4 in.	71.00		
18" 5/16 in.	78.00	99.00	125.50
20" 3/16 in.	66.00		
20" 1/4 in.	79.00		
20" 5/16 in.	87.00	106.00	136.00

Cable Tool Drilling	Cost Per Foot of Depth
6"	\$18.00 - \$23.00
8"	\$22.00 - \$25.00
10"	\$25.00 - \$30.00
12"	\$37.00 - \$45.00
14"	\$40.00 - \$50.00
16"	\$45.00 - \$55.00
18"	\$55.00 - \$75.00

State Law requires 20' seal in all well shafts.

6"	\$300.00
8"	340.00
10"	400.00
12"	500.00
14"	600.00
16"	600.00
18"	600.00

PUMPS

WINDMILLS

COST INSTALLED

Wheel or Fan Diameter	Weight (Pounds)	Cost	Installation	Total
6' mill	200	\$2,300	\$1,150	\$3,450
8' mill	370	2,600	1,150	3,750
10' mill	660	3,660	1,350	5,010
12' mill	1,100	5,200	1,600	6,450
14' mill	1,700	7,500	1,800	9,300
16' mill	2,500	9,900	2,200	12,100

TOWER REQUIREMENTS FOR FAN SIZE IN DIAMETER

Tower Height	Windmill Size				
	6' - 8' Fan	10' Fan	12' Fan	14' Fan	16' Fan
21'	\$1,465	\$1,555			
27'	1,686	2,110	\$2,415	\$2,625	
33'	1,938	2,230	2,654	3,057	\$4,105
40'	2,400	2,633	3,116	3,359	4,708
47'	2,692	3,135	3,660	4,712	5,614

Windmill installation costs are determined by the following:

- Tower height
- Fan diameter
- Force pump: size and diameter
- Cylinder: size and type
- Pipe: size and length
- Rod: material, size and length.

Force pump, cylinder pipe, rod, and miscellaneous costs range from **\$750 to \$2,100**.

<u>Example</u>	
10' Fan	\$5,010
33' Tower	2,230
Force Pump, Cylinder Pipe, Rod and Miscellaneous Costs	<u>1,300</u>
	\$8,540

Refurbished Windmill: Deduct 35 to 40 percent from above prices.

PUMPS

WINDMILLS

WATER STORAGE TANKS

GALVANIZED COVERED STORAGE TANKS

Gallons	Diameter	Height	Gauge	Weight (Pounds)	Price
1,044	6' 8"	48"	12	670	\$ 980
1,504	8' 10"	48"	12	912	1,175
1,900	6' 4"	96"	12	1,014	1,240
2,500	7' 4"	96"	12	1,321	1,555
2,880	7' 10"	96"	12	1,329	1,650
3,200	8' 3"	96"	12	1,423	1,785
3,500	8' 8"	96"	12	1,520	1,900
4,200	9' 5 1/2"	96"	12	1,724	2,350
5,000	10' 4"	96"	12	1,924	2,530
5,500	10' 10"	96"	12	2,080	2,790
6,000	11' 4"	96"	12	2,163	2,900
6,500	11' 10"	96"	12	2,210	3,110
7,500	10' 4"	12'	12	2,553	3,370
8,600	9' 7"	16'	12	2,856	3,735
10,000	9' 9"	18'	12	3,169	4,300
10,000	11' 11"	12'	12	3,073	4,300
12,000	10' 2"	20'	12	3,667	4,890
15,000	11' 11"	18'	10	5,376	6,440
17,500	11' 2"	24'	10	5,995	7,400
20,000	11' 11"	24'	10	6,480	8,480
25,000	18' 10"	12'	10	7,320	9,740
30,000	20' 9"	12'	10	8,500	11,130

AH 534.71: CORRALS AND FENCES

This section contains various costs associated with corrals and fences. Specifications and costs are included for:

- Steel fencing
- Barbed wire fencing
- Wood fencing
- Wood gates
- Metal gates
- Metal panels
- Vinyl/P.V.C. fencing
- Cattle squeeze

CORRALS AND FENCES

STEEL FENCING

Height and Type	Fence Cost Per Lineal Foot	Additions
<u>11 Gauge</u>		
3' chain link	\$4.95	Top Rail: \$1.25 per lineal foot
4' chain link	5.50	
5' chain link	6.70	Barbed wire, 3 strands:
6' chain link	8.10	\$1.65 per lineal foot
8' chain link	10.20	
10' chain link	12.90	Barbed coils: \$5.75 per
12' chain link	15.30	lineal foot
<u>9 Gauge</u>		
3' chain link	\$5.50	Barbed wire, 3 strands:
4' chain link	5.80	\$1.80 per lineal foot on
5' chain link	6.90	10' and 12' fence
6' chain link	8.40	
8' chain link	11.10	
10' chain link	14.20	
12' chain link	16.80	

BARBED WIRE FENCING

Size and Type	Per Lineal Foot/1 Mile or More
Barbed wire, 3 strand	\$1.80 to \$2.20
Barbed wire, 4 strand	\$2.00 to \$2.40
Barbed wire, 5 strand	\$2.20 to \$2.60
2 strands barbed, 32" woven wire, steel posts	\$3.20 to \$3.40

Fence costs are complete—fencing and posts. Gates are to be added. Do not deduct fence for gates. Posts are set in concrete on 10' centers.

CORRALS AND FENCES

WOOD FENCING—COST PER LINEAL FOOT

Rail Size	Post Size	Number of Rails			
		1	2	3	6
2" x 8"	6" x 6"	\$6.40	\$7.40	\$9.50	\$12.00
2" x 6"	6" x 4"	4.93	5.37	5.81	7.12
2" x 4"	6" x 4"	4.78	5.06	5.34	6.40
1" x 8"	6" x 4"	4.60	5.20	5.50	6.40
1" x 6"	6" x 4"	4.30	4.70	5.30	6.10
1 ¼" x 6"	6" x 4"	4.50	4.50	5.55	6.60
2" x 6"	4" x 4"	4.43	4.87	5.30	6.40

All posts figured at 8' on center.

WOOD GATES—COST PER GATE

Height/ Description	Width						
	4'	6'	8'	10'	12'	16'	20'
4' 5 Rails	\$50	\$64	\$81	\$156	\$162	\$178	\$190
5' 6 Rails	63	75	121	169	182	196	209
6' 7 Rails	75	87	174	185	202	213	230

METAL GATES (INCLUDING POSTS)—COST PER GATE

Height/ Description	Width					
	3'	4'	10'	12'	14'	16'
4' 1 3/8" Galvanized Tube Galvanized Fabric Including Hardware	\$68	\$74	\$126	\$137	\$158	\$173
5' 1 5/8" Standard Pipe Fabric Including Hardware	120	137	210	242	263	294
6' 1 5/8" Standard Pipe Fabric Including Hardware	130	147	242	273	305	336

CORRALS AND FENCES

METAL GATES

5-BAR ADJUSTABLE GATES—5' IN HEIGHT

Size	Cost Per Gate
3' to 4'	\$ 78.00
4' to 6'	88.00
6' to 8'	112.00
8' to 10'	126.00
10' to 12'	137.00
12' to 14'	163.00
14' to 16'	194.00
16' to 20'	245.00

6-BAR ADJUSTABLE GATES—5' IN HEIGHT

Size	Cost Per Gate
3' to 4'	\$ 86.00
4' to 6'	100.00
6' to 8'	127.00
8' to 10'	143.00
10' to 12'	154.00
12' to 14'	184.00
14' to 16'	195.00
16' to 20'	240.00

5-BAR ADJUSTABLE PANEL USED FOR STALLS OR PENS

Size	Cost Per Gate
8' to 10'	\$111.00
10' to 12'	127.00
12' to 14'	136.00
14' to 16'	158.00
16' to 18'	177.00
18' to 20'	191.00
20' to 22'	204.00
22' to 24'	218.00
24' to 26'	224.00

Add for the hinge and latch posts - **\$35 to \$40**

CORRALS AND FENCES

METAL PANELS

6-BAR ADJUSTABLE PANEL USED FOR STALLS OR PENS

Size	Cost Per Gate
8' to 10'	\$126.00
10' to 12'	140.00
12' to 14'	154.00
14' to 16'	178.00
16' to 18'	192.00
18' to 20'	218.00
20' to 22'	229.00
22' to 24'	246.00
24' to 26'	255.00

3-BAR FENCE PANEL

Size	Cost Per Gate
10'	\$ 70.00
12'	82.00
16'	95.00
18'	101.00
20'	113.00
24'	126.00

PORTABLE LOADING CHUTE

Size	Cost Per Gate
30" x 5' High	\$1,000

5-BAR SOLID PANEL

Size	Cost Per Gate
10'	\$100.00
12'	111.00
16'	147.00
18'	157.00
20'	170.00
24'	191.00

6-BAR SOLID PANEL

Size	Cost Per Gate
10'	\$ 112.00
12'	126.00
16'	167.00
18'	174.00
20'	193.00
24'	221.00

CORRALS AND FENCES

VINYL/P.V.C. FENCING (White)

Post Size	Rail Size	Number of Rails	Cost Per Lineal Foot Installed
5" x 5"	1-1/2" x 5-1/2" x 16'	3	\$8.50
5" x 5"	1-1/2" x 5-1/2" x 16'	4	\$9.25

Prices based on 1,000' +

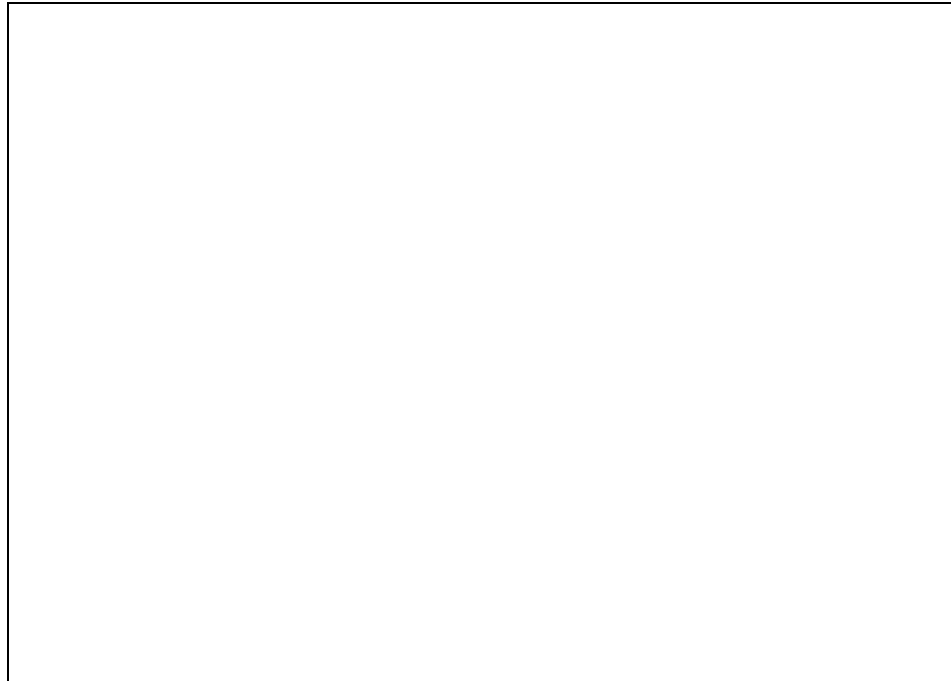
Height: 54 inches or 6 1/2 feet

Posts: Set in concrete—10" diameter, 30" deep, 8' on center

Gates: 12' Metal gates (preferred)—**\$650** installed, plus paint

12' P.V.C. gates (have tendency to sag)—**\$1,000** installed

Color: Add 10 percent



CORRALS AND FENCES

CATTLE SQUEEZE

Hydraulic Metal	\$5,000
Upright Metal	\$1,800 to \$2,000
Upright Metal Extended	\$1,950 to \$2,100
Calf Chute or Table	\$850

AH 534.75: GREENHOUSES

This section contains specifications and costs for greenhouses. Commercial greenhouses are constructed with steel or wood posts and trusses on 10' \pm centers. Some of the greenhouses have a polycarbonate, fiberglass cover, glass cover, or a polyethylene plastic cover. The span of the truss is generally 20 to 40 feet.

- Some greenhouses are constructed as Quonset design metal ribs and fiberglass cover.
- Wall heights vary from 7 feet to 10 feet on the straight wall construction.

GREENHOUSES

BUILDING SPECIFICATIONS

Components	Low Quality	Average Quality	High Quality
Wall and Roof	Light pipe, 4' wall, single light polyethylene cover, fiberglass ends	Galvanized steel frame, 8' wall, double polycarbonate or fiberglass cover	Heavy steel frame, 8' wall, glass or multi-wall polycarbonate cover
Floor	Dirt—some gravel	Gravel—some concrete walks	Adequate concrete walks, concrete foundation
Interior	No lighting, minimum water	Average lighting, water, and roof vents	Ample lighting, water, roof vents, and exhaust fans

SQUARE-FOOT COSTS

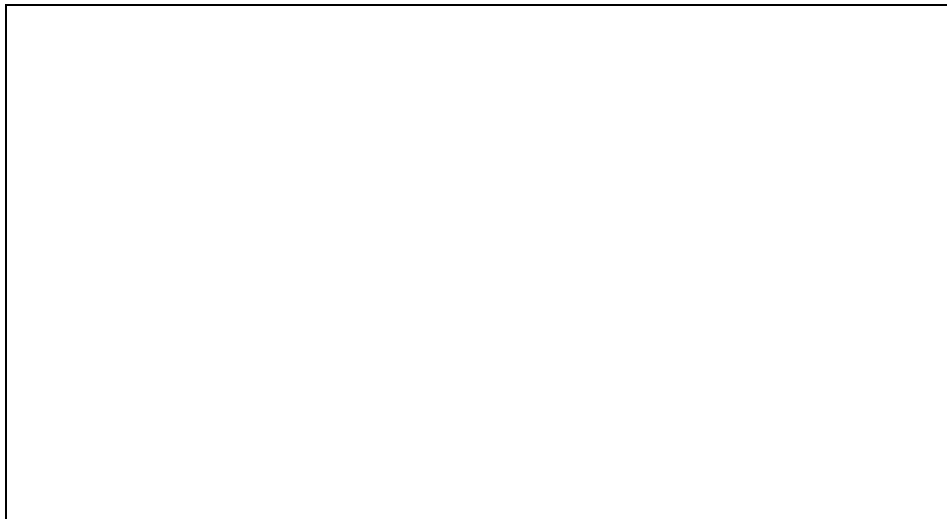
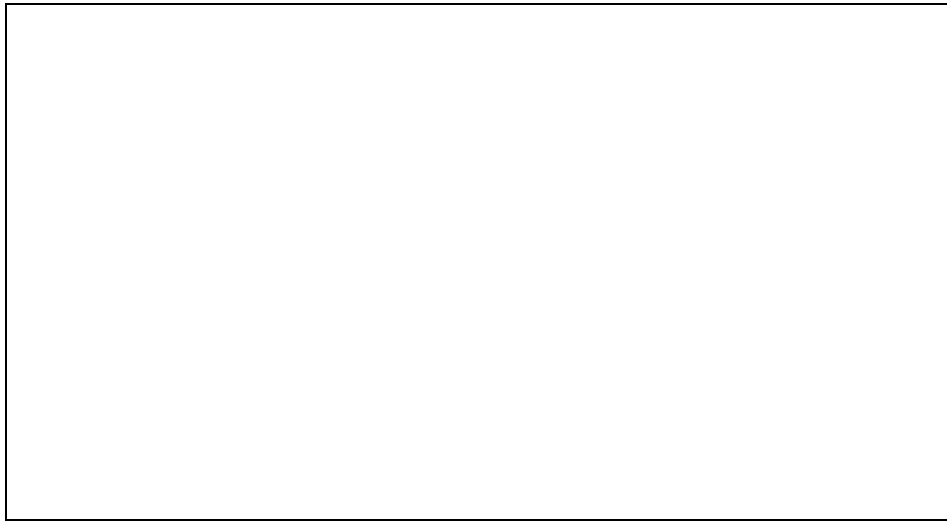
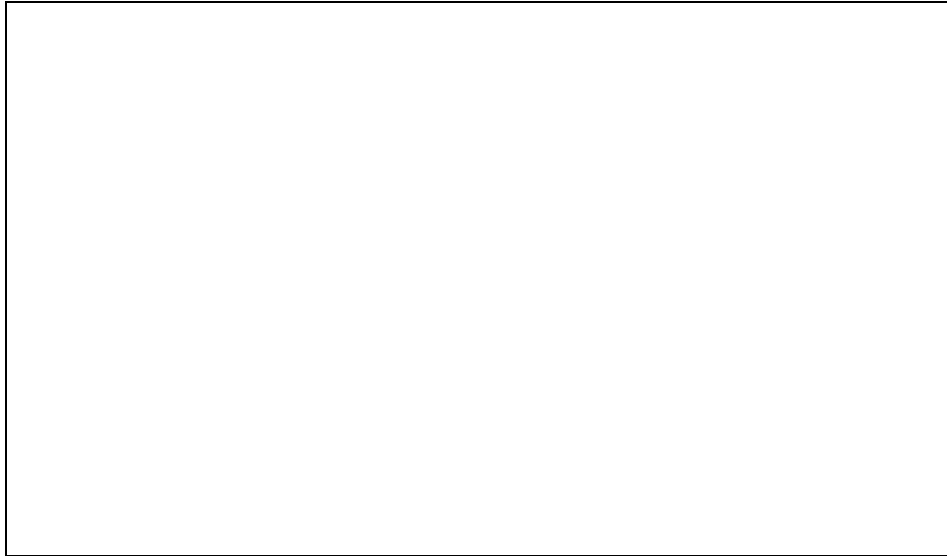
Quality	Square-Foot Area					
	3,000-5,000	10,000	20,000	30,000	40,000	50,000
Low	\$3.06	\$2.75	\$2.65	\$2.50	\$2.24	\$2.04
Average	12.24	11.48	9.79	9.18	8.77	8.57
High	16.32	15.30	13.26	12.60	11.73	11.48

ADDITIVES

Additional concrete walk	\$2.40 to \$2.60 per square foot
Benching	\$2.20 to \$2.50 per square foot—average quality
Gravel floor	\$.25 per square foot

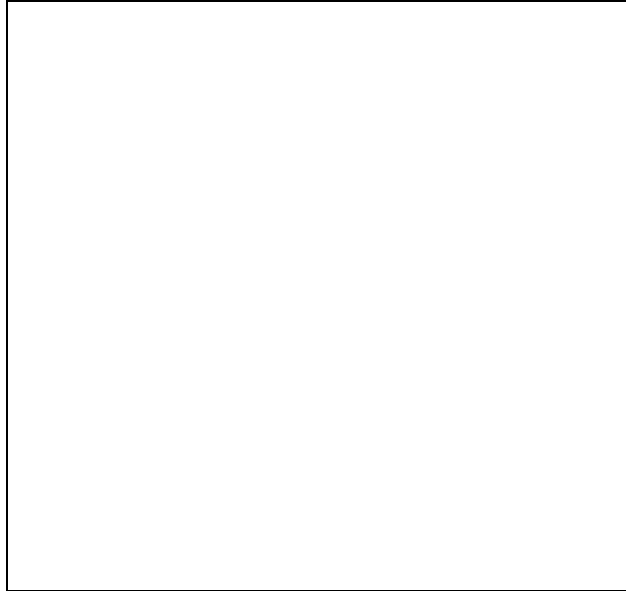
GREENHOUSES

CLIMATE CONTROL



GREENHOUSES

GREENHOUSE FRAMING



GREENHOUSES

SHADE CLOTH HOUSES

FAIR TO LOW COST

Wood or steel post construction, no walls. Overhead cable support with wire, covered by a flat shade fabric normally 7' to 9' high. The following costs are with a dirt floor.

Square-Foot Area	Cost Per Square Foot
Under 10,000	\$1.03
10,000 – 20,000	\$.77 - \$.82
20,000 – 40,000	\$.72 - \$.78
40,000 Up	\$.68 - \$.70

ADDITIVE

Gravel Floor \$.25 per square foot



AH 534.76: LAND DEVELOPMENT AND DRAINAGE TILE

LEVELING COST

Item	Per Acre
Native Land	\$300 - \$500
Relieving	\$125 - \$200
Touch-Up Leveling	\$60 - \$80
Rescaping	\$60 - \$80

EARTH MOVING

Size	Cost
Per cubic yard	\$.55 - \$.65

RIPPING

Item	Cost
Clay 5' deep	\$325 - \$375
Clay 6' deep	\$350 - \$400
Loamy or sandy soil	\$225 - \$275
Hard pan 4' - 6' deep	\$350 - \$650

NOTE:

1. Ripping costs are based on four-foot centers.
2. Ripping cost with a slip plow attached to shank (superior mixing and breaking of soils) is typically done on six-foot centers, and the cost is equal to standard ripping on four-foot centers.
3. Typically takes ten hours to rip seven acres on four-foot centers.

LAND DEVELOPMENT AND DRAINAGE TILE

Recent drainage tile installations use corrugated plastic tubing. The spacing varies from 100 feet to 400 feet on centers. The older type installation includes perforated tile with wide trenches. A 5-inch corrugated plastic drain tubing is installed in a 12-inch trench versus a 24-inch to 27-inch trench for the older type installation. The cost for gravel fill is much less because of the narrower trench.

The cost installed of 5-inch corrugated plastic tubing on 400-foot centers, 7 1/2-feet deep including sump and pump, and trench width of 12 inches with gravel fill over the pipe is as follows.

DRAINAGE TILE

Loamy Soils	\$465 per acre
Rocky Soils	\$630 per acre

Reduce the above cost 25 percent if system lacks a pump or sump.

Increase the above cost 25 percent if the system has 100-foot centers, with 4-inch lines.

TILE COSTS - INSTALLED

Includes trenching and perforated pipe packed in 3" pee gravel	
<u>Pipe Size</u>	<u>Cost</u>
4"	\$2.25
5"	2.50
6"	2.75
8"	3.55
10"	5.25
12"	6.50
15"	9.00

The above costs are for a standard system on level accessible soil. Costs are higher for undulating and remote farmland.

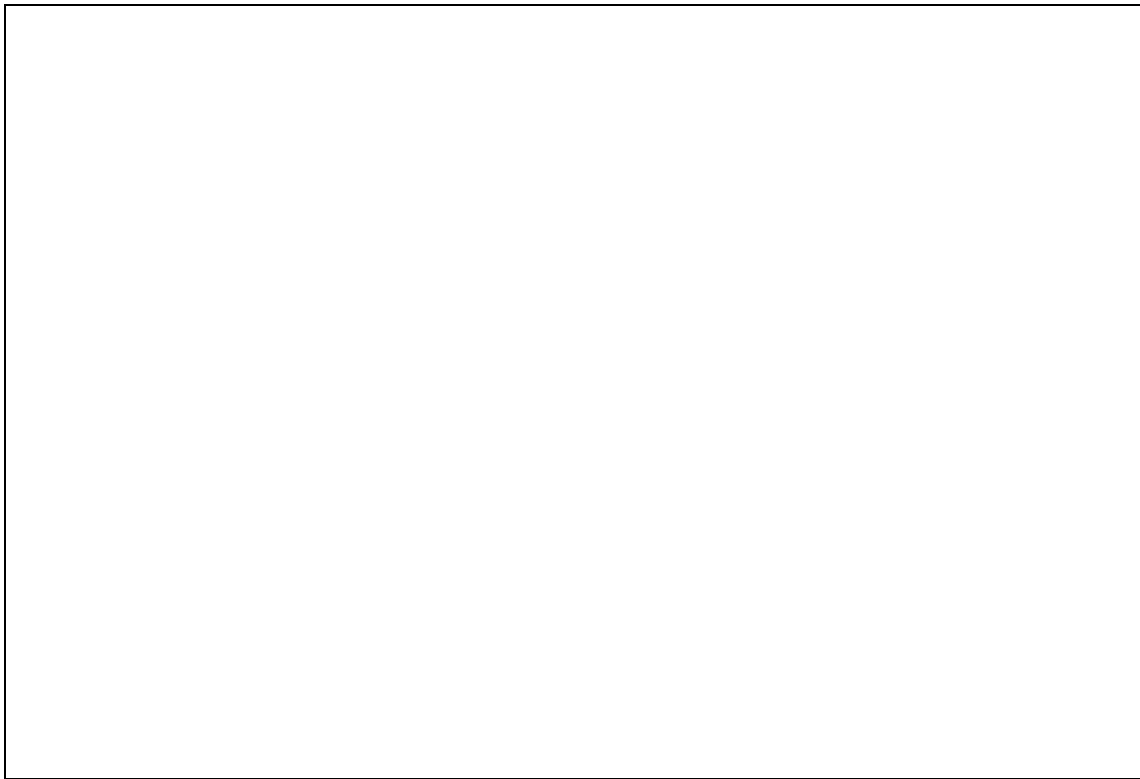
AH 534.77: VINEYARD STAKES AND TRELLISES

Vineyard stakes and trellises costs vary due to the following:

- Type and quality of material
- Spacing between the rows of vines
- Spacing between the vines within the rows
- Kind of vineyard
- Cost of labor (farm labor or commercial contractor)

This section contains costs on the following:

- Table Grape Trellises
- Raisin Grape Trellises
- Wine Grape Trellises
- Miscellaneous vineyard components

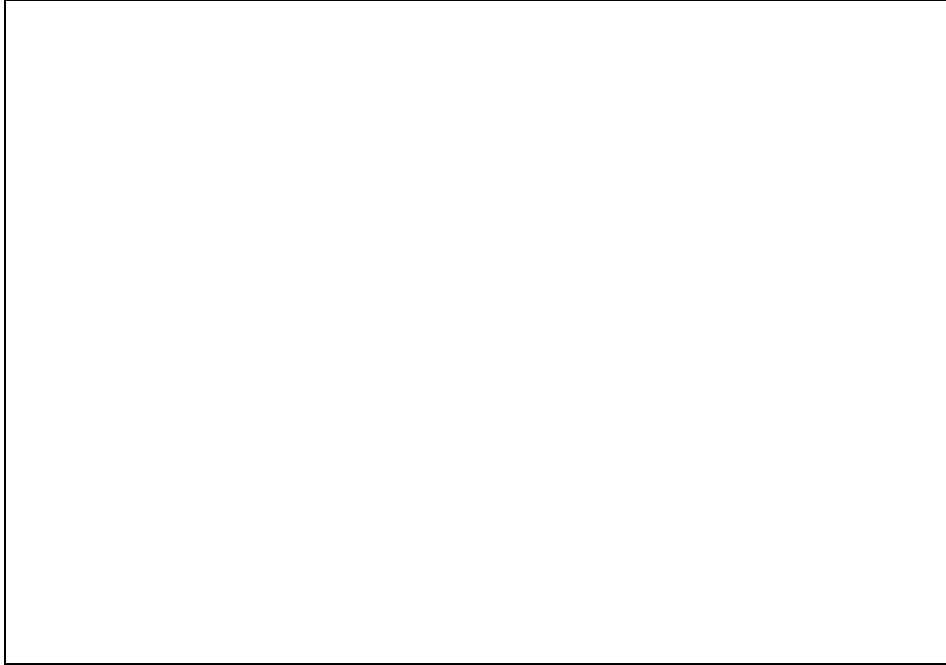


Sun Maid Southside Dry on Vine Trellis

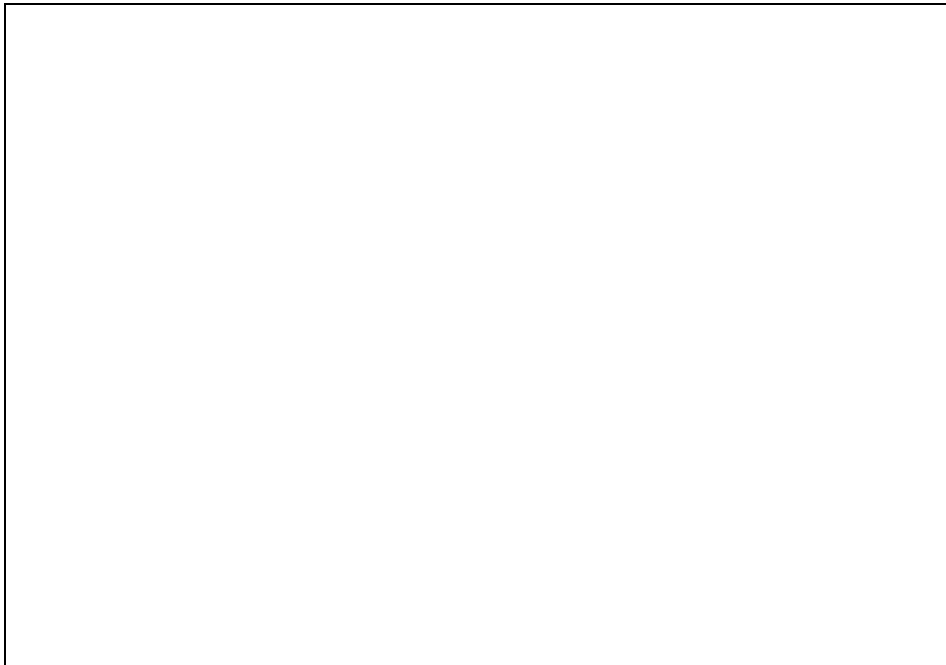
VINEYARD STAKES AND TRELLISES

TABLE GRAPES

SINGLE CROSSARM



Seven-foot stake and 36" to 42" crossarm with four wires (13-gauge)



VINEYARD STAKES AND TRELLISES

TABLE GRAPES

SINGLE CROSSARM

10 FOOT ROWS

	Spacing—6' x 10' or 7' x 10' or 8' x 10'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$4.60		
Every 15 feet	\$4.60	290	\$1,334
Every 18 feet	\$4.60	242	\$1,113
Every 21 feet	\$4.60	207	\$952
Every 24 feet	\$4.60	182	\$837
Four wires			\$320
End post with anchor (installed)	\$25.00	14	\$350
End post without anchor (installed)	\$18.00	14	\$252

11 FOOT ROWS

	Spacing—6' x 11' or 7' x 11' or 8' x 11'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$4.60		
Every 15 feet	\$4.60	264	\$1,214
Every 18 feet	\$4.60	220	\$1,012
Every 21 feet	\$4.60	188	\$865
Every 24 feet	\$4.60	165	\$759
Four wires			\$290
End post with anchor (installed)	\$25.00	13	\$325
End post without anchor (installed)	\$18.00	13	\$234

12 FOOT ROWS

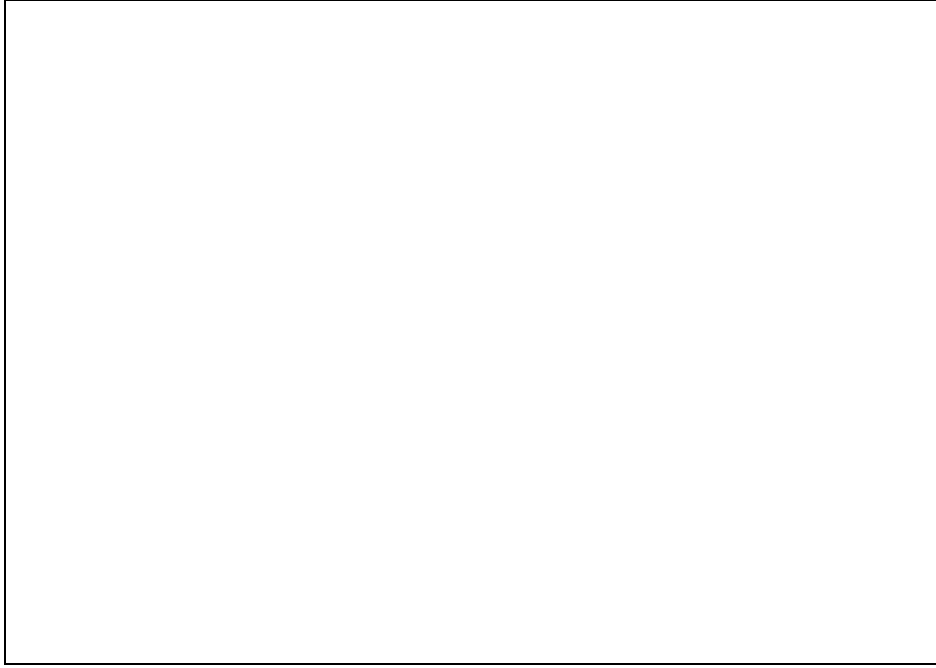
	Spacing—6' x 12' or 7' x 12' or 8' x 12'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$4.60		
Every 15 feet	\$4.60	242	\$1,113
Every 18 feet	\$4.60	201	\$925
Every 21 feet	\$4.60	172	\$791
Every 24 feet	\$4.60	151	\$695
Four wires			\$264
End post with anchor (installed)	\$25.00	12	\$300
End post without anchor (installed)	\$18.00	12	\$216

Based on 600 foot rows

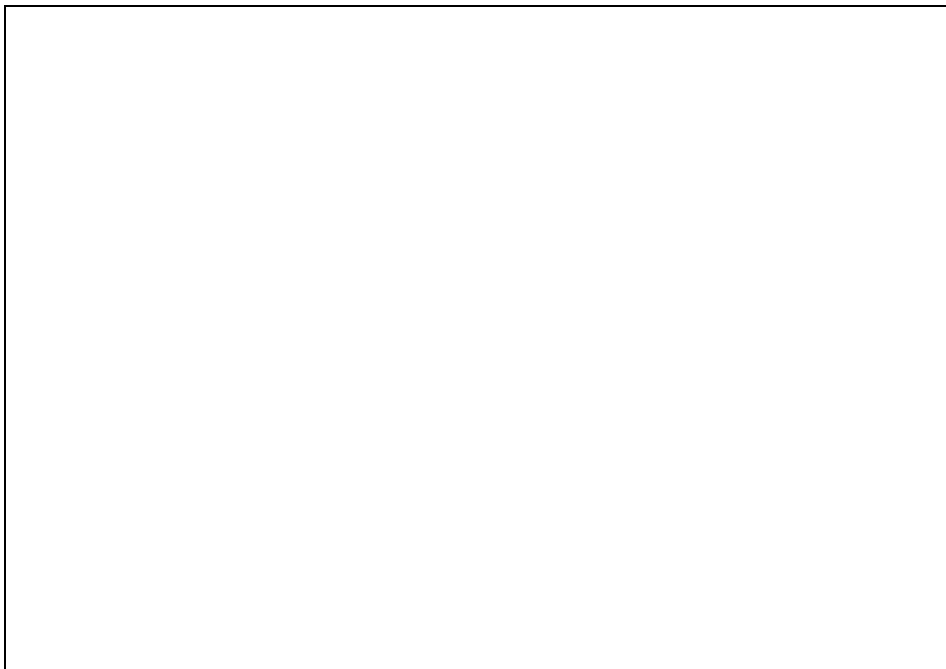
VINEYARD STAKES AND TRELLISES

TABLE GRAPES

DOUBLE CROSSARM



Seven-foot stake, 42" top crossarm, 24" to 30" lower crossarm, with six wires (13-gauge)



VINEYARD STAKES AND TRELLISES

TABLE GRAPES

DOUBLE CROSSARM

10 FOOT ROWS

	Spacing—6' x 10' or 7' x 10' or 8' x 10'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$5.45		
Every 15 feet	\$5.45	290	\$1,580
Every 18 feet	\$5.45	242	\$1,319
Every 21 feet	\$5.45	207	\$1,128
Every 24 feet	\$5.45	182	\$992
Six wires			\$477
End post with anchor (installed)	\$25.00	14	\$350
End post without anchor (installed)	\$18.00	14	\$252

11 FOOT ROWS

	Spacing—6' x 11' or 7' x 11' or 8' x 11'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$5.45		
Every 15 feet	\$5.45	264	\$1,439
Every 18 feet	\$5.45	220	\$1,199
Every 21 feet	\$5.45	188	\$1,025
Every 24 feet	\$5.45	165	\$900
Six wires			\$435
End post with anchor (installed)	\$25.00	13	\$325
End post without anchor (installed)	\$18.00	13	\$234

12 FOOT ROWS

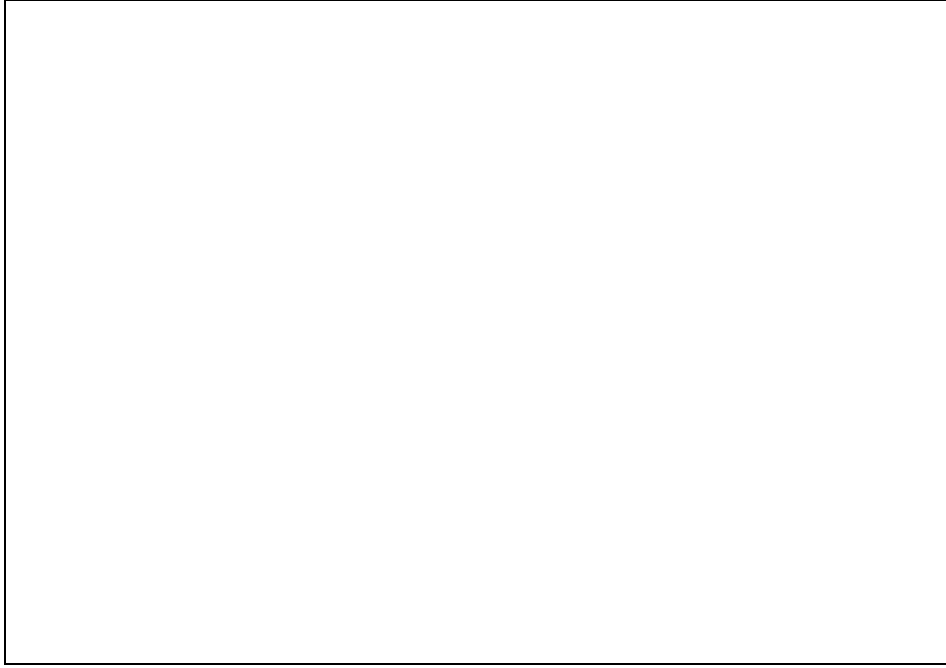
	Spacing—6' x 12' or 7' x 12' or 8' x 12'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$5.45		
Every 15 feet	\$5.45	242	\$1,319
Every 18 feet	\$5.45	201	\$1,095
Every 21 feet	\$5.45	172	\$937
Every 24 feet	\$5.45	151	\$823
Six wires			\$400
End post with anchor (installed)	\$25.00	12	\$300
End post without anchor (installed)	\$18.00	12	\$216

Based on 600 foot rows

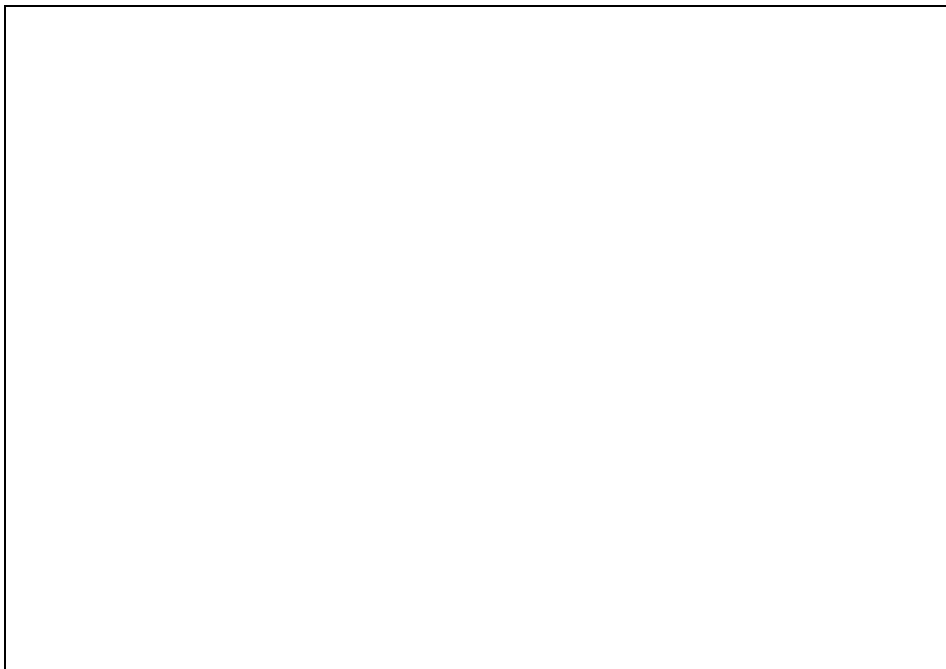
VINEYARD STAKES AND TRELLISES

TABLE GRAPES

"Y" TRELLIS



Eight-foot steel post, 4' angle iron on each side of post forming V with the tops approximately 5' to 6' apart, with 3 to 4 wires (13-gauge) on each side



VINEYARD STAKES AND TRELLISES

TABLE GRAPES

"Y" TRELLIS

10 FOOT ROWS

	Spacing—6' x 10' or 7' x 10' or 8' x 10'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$9.25		
Every 18 feet	\$9.25	242	\$2,239
Every 21 feet	\$9.25	207	\$1,915
Every 24 feet	\$9.25	182	\$1,684
Six wires			\$477
Eight wires			\$639
End post with anchor (installed)	\$25.00	14	\$350

11 FOOT ROWS

	Spacing—6' x 11' or 7' x 11' or 8' x 11'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$9.25		
Every 18 feet	\$9.25	220	\$2,035
Every 21 feet	\$9.25	188	\$1,739
Every 24 feet	\$9.25	165	\$1,526
Six wires			\$435
Eight wires			\$582
End post with anchor (installed)	\$25.00	13	\$325

12 FOOT ROWS

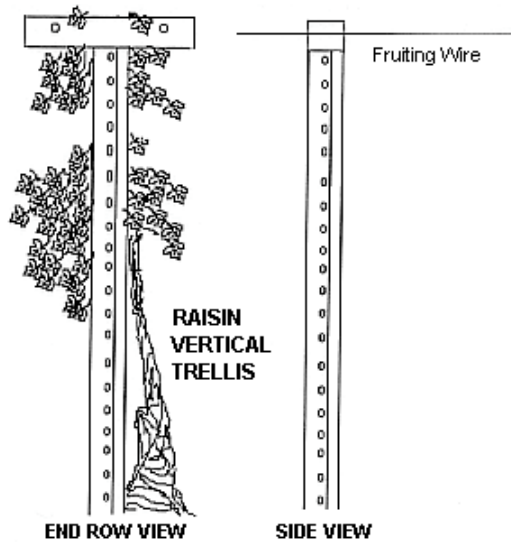
	Spacing—6' x 12' or 7' x 12' or 8' x 12'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$9.25		
Every 18 feet	\$9.25	201	\$1,860
Every 21 feet	\$9.25	172	\$1,591
Every 24 feet	\$9.25	151	\$1,397
Six wires			\$400
Eight wires			\$533
End post with anchor (installed)	\$25.00	12	\$300

Based on 600 foot rows

VINEYARD STAKES AND TRELLISES

RAISIN GRAPES

VERTICAL TRELLIS



Commonly used on raisins with 12' spacing.

Materials: 8' wooden end posts with 7' medium T stakes at each vine. A single 24" metal crossarm with two 13-gauge wires.



VINEYARD STAKES AND TRELLISES

RAISIN GRAPES

TRELLIS

10 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 10'	6' x 10'	7' x 10'
Light 7' stake and 24" crossarm	\$2.20				
Every 5 feet	\$2.20	871	\$1,916		
Every 6 feet	\$2.20	726		\$1,597	
Every 7 feet	\$2.20	622			\$1,368
Two wires			\$160	\$160	\$160
End post	\$18.00	14	\$252	\$252	\$252
Light 7' stake with no crossarm	\$1.55		\$1,350	\$1,125	\$964
One wire			\$80	\$80	\$80

11 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 11'	6' x 11'	7' x 11'
Light 7' stake and 24" crossarm	\$2.20				
Every 5 feet	\$2.20	792	\$1,742		
Every 6 feet	\$2.20	660		\$1,452	
Every 7 feet	\$2.20	566			\$1,245
Two wires			\$144	\$144	\$144
End post	\$18.00	13	\$234	\$234	\$234
Light 7' stake with no crossarm	\$1.55		\$1,227	\$1,023	\$877
One wire			\$72	\$72	\$72

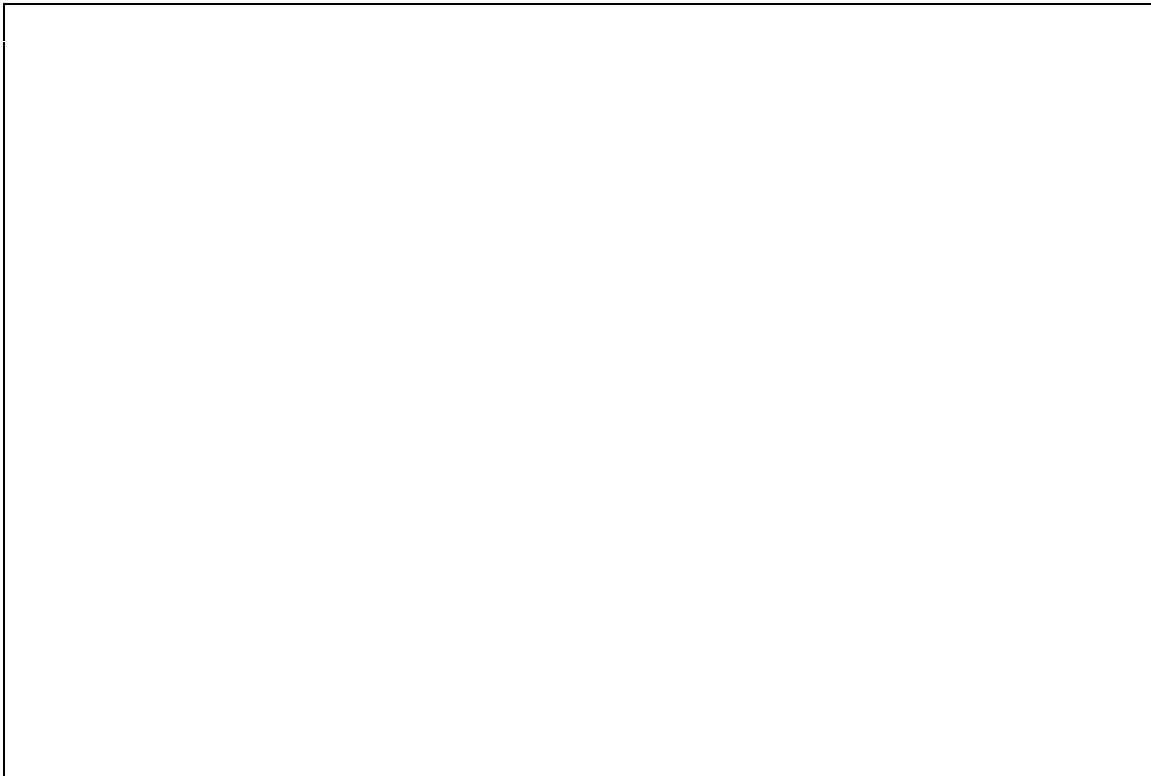
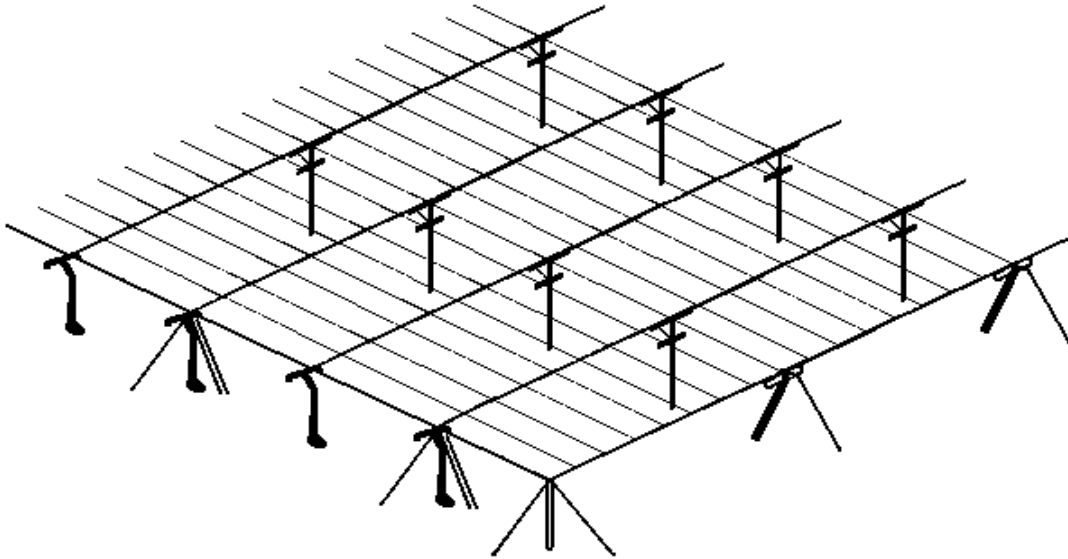
12 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 12'	6' x 12'	7' x 12'
Light 7' stake and 24" crossarm	\$2.20				
Every 5 feet	\$2.20	726	\$1,597		
Every 6 feet	\$2.20	605		\$1,331	
Every 7 feet	\$2.20	518			\$1,139
Two wires			\$122	\$122	\$122
End post	\$18.00	12	\$216	\$216	\$216
Light 7' stake with no crossarm	\$1.55		\$1,125	\$938	\$803
One wire			\$61	\$61	\$61

VINEYARD STAKES AND TRELLISES

RAISIN GRAPES

OVERHEAD DRY ON VINE TRELLIS



Commonly used in 12' row with 6' between vines.

Materials: Wood post 12' on ends, 9' on sides, 10' wood post every third vine with 36" crossarm, 8 wires per row, and cable support.

Trellising Cost Per Acre:

\$3,200 to \$3,800 on 6' x 12' spacing

VINEYARD STAKES AND TRELLISES

RAISIN GRAPES

SUN MAID SOUTHSIDE DRY ON VINE TRELLIS



8' T-post every 28' with two 10' crossarms and 5 wires. In between T-posts is 2 bent 7' to 8' T-posts with 2 wires. Each vine will have a training stake. Each end has a heavy steel post with anchors.

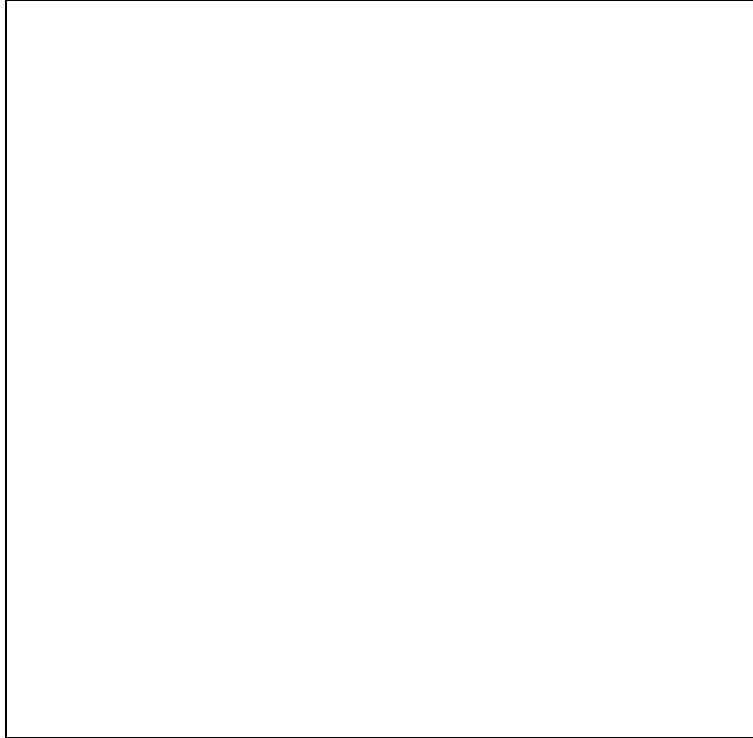
Cost: **\$2,000 to \$2,400** for 7' x 12' spacing.



VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS



T-post with crossarm every vine

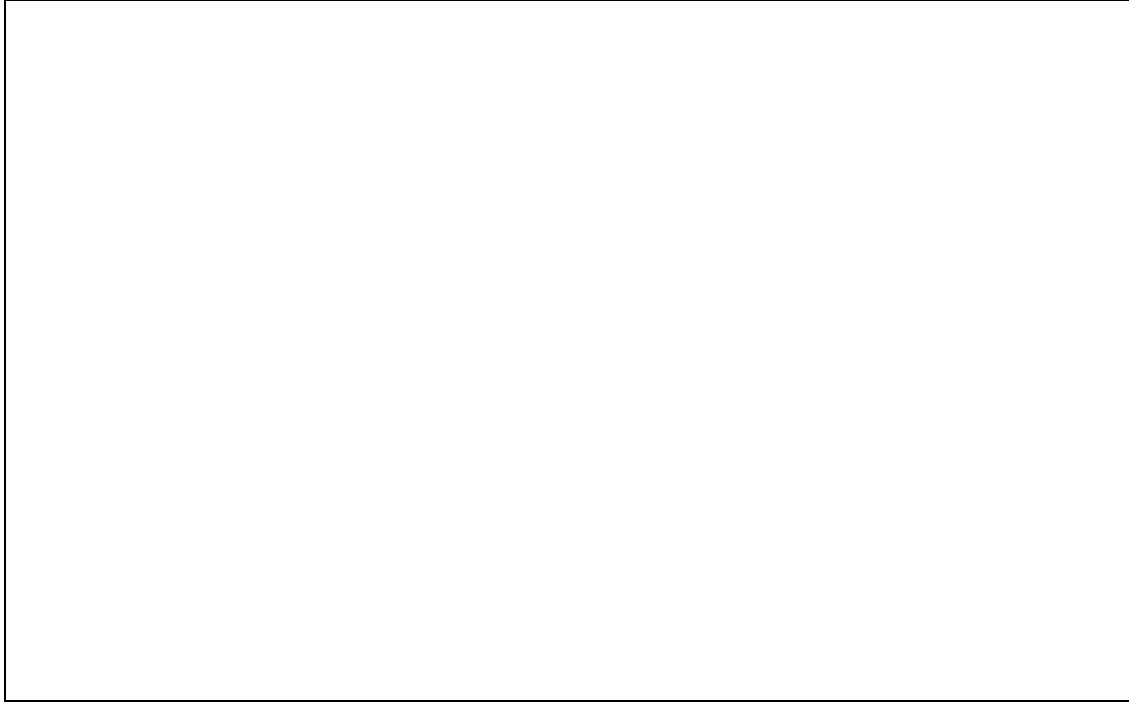


T-post and V crossarm

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS



8' vertical line post with 4' T-posts in between



Vertical line post with light grape stakes in between

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

8 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		1,089	907	778	681
		Cost Per Acre			
		5' x 8'	6' x 8'	7' x 8'	8' x 8'
18 end posts per acre with anchor	\$25	\$450	\$450	\$450	\$450
18 end posts per acre without anchor	\$18	\$324	\$324	\$324	\$324
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$1.55	\$1,688	\$1,405	\$1,205	\$1,055
Every other vine	\$.78	\$849	\$707	\$607	\$531
Every third vine	\$.51	\$555	\$463	\$397	\$347
Every fourth vine	\$.39	\$425	\$354	\$303	\$266
8' Vertical line post					
Every vine	\$3.55	\$3,866	\$3,220	\$2,762	\$2,417
Every other vine	\$1.78	\$1,938	\$1,614	\$1,384	\$1,212
Every third vine	\$1.18	\$1,285	\$1,070	\$918	\$803
Every fourth vine	\$.89	\$969	\$807	\$692	\$606
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.46				
One rebar between posts	\$.23	\$250	\$209	\$179	\$157
Two rebars between posts	\$.30	\$327	\$272	\$233	\$204
Three rebars between posts	\$.35	\$381	\$317	\$272	\$238
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$.85	\$926	\$771	\$661	\$578
Every other vine	\$.43	\$468	\$390	\$335	\$292
Every third vine	\$.29	\$316	\$263	\$225	\$197
Every fourth vine	\$.21	\$229	\$190	\$163	\$143
Two wires		\$199	\$199	\$199	\$199
Three wires		\$299	\$299	\$299	\$299
Four wires		\$398	\$398	\$398	\$398
Five wires		\$498	\$498	\$498	\$498
Six wires		\$599	\$599	\$599	\$599
Seven wires		\$698	\$698	\$698	\$698
Eight wires		\$797	\$797	\$797	\$797

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

9 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		968	807	691	605
		Cost Per Acre			
		5' x 9'	6' x 9'	7' x 9'	8' x 9'
16 end posts per acre with anchor	\$25	\$400	\$400	\$400	\$400
16 end posts per acre without anchor	\$18	\$288	\$288	\$288	\$288
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$1.55	\$1,500	\$1,250	\$1,071	\$938
Every other vine	\$.78	\$755	\$629	\$539	\$472
Every third vine	\$.51	\$494	\$412	\$352	\$309
Every fourth vine	\$.39	\$378	\$315	\$269	\$236
8' Vertical line post					
Every vine	\$3.55	\$3,436	\$2,864	\$2,453	\$2,148
Every other vine	\$1.78	\$1,723	\$1,436	\$1,230	\$1,077
Every third vine	\$1.18	\$1,142	\$952	\$815	\$714
Every fourth vine	\$.89	\$861	\$718	\$615	\$538
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.46				
One rebar between posts	\$.23	\$222	\$186	\$159	\$139
Two rebars between posts	\$.30	\$290	\$242	\$207	\$181
Three rebars between posts	\$.35	\$338	\$282	\$241	\$211
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$.85	\$822	\$686	\$587	\$514
Every other vine	\$.43	\$416	\$347	\$297	\$260
Every third vine	\$.29	\$281	\$234	\$200	\$175
Every fourth vine	\$.21	\$203	\$169	\$145	\$127
Two wires		\$178	\$178	\$178	\$178
Three wires		\$267	\$267	\$267	\$267
Four wires		\$356	\$356	\$356	\$356
Five wires		\$445	\$445	\$445	\$445
Six wires		\$534	\$534	\$534	\$534
Seven wires		\$623	\$623	\$623	\$623
Eight wires		\$712	\$712	\$712	\$712

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

10 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		871	726	622	544
		Cost Per Acre			
		5' x 10'	6' x 10'	7' x 10'	8' x 10'
14 end posts per acre with anchor	\$25	\$350	\$350	\$350	\$350
14 end posts per acre without anchor	\$18	\$252	\$252	\$252	\$252
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$1.55	\$1,350	\$1,125	\$964	\$843
Every other vine	\$.78	\$679	\$566	\$485	\$424
Every third vine	\$.51	\$444	\$370	\$317	\$277
Every fourth vine	\$.39	\$340	\$283	\$243	\$212
8' Vertical line post					
Every vine	\$3.55	\$3,092	\$2,577	\$2,208	\$1,931
Every other vine	\$1.78	\$1,550	\$1,292	\$1,107	\$968
Every third vine	\$1.18	\$1,028	\$857	\$734	\$642
Every fourth vine	\$.89	\$775	\$646	\$554	\$484
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.46				
One rebar between posts	\$.23	\$200	\$167	\$143	\$125
Two rebars between posts	\$.30	\$261	\$218	\$187	\$163
Three rebars between posts	\$.35	\$304	\$254	\$218	\$190
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$.85	\$740	\$617	\$528	\$462
Every other vine	\$.43	\$375	\$312	\$264	\$231
Every third vine	\$.29	\$253	\$211	\$180	\$158
Every fourth vine	\$.21	\$183	\$152	\$131	\$114
Two wires		\$160	\$160	\$160	\$160
Three wires		\$240	\$240	\$240	\$240
Four wires		\$320	\$320	\$320	\$320
Five wires		\$400	\$400	\$400	\$400
Six wires		\$480	\$480	\$480	\$480
Seven wires		\$560	\$560	\$560	\$560
Eight wires		\$640	\$640	\$640	\$640

VINEYARD STAKES AND TRELLISES

WINE GRAPES

TRELLIS

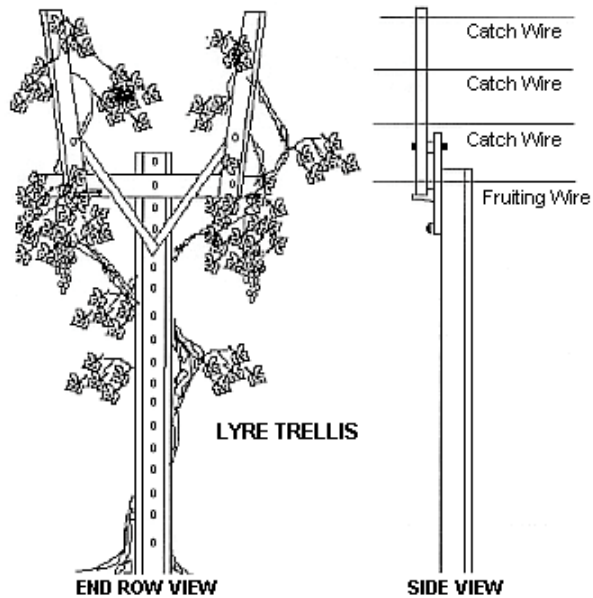
11 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		792	660	566	495
		Cost Per Acre			
		5' x 11'	6' x 11'	7' x 11'	8' x 11'
13 end posts per acre with anchor	\$25	\$325	\$325	\$325	\$325
13 end posts per acre without anchor	\$18	\$234	\$234	\$234	\$234
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$1.55	\$1,228	\$1,023	\$877	\$767
Every other vine	\$.78	\$618	\$515	\$441	\$386
Every third vine	\$.51	\$404	\$337	\$289	\$252
Every fourth vine	\$.39	\$309	\$257	\$221	\$193
8' Vertical line post					
Every vine	\$3.55	\$2,812	\$2,343	\$2,009	\$1,757
Every other vine	\$1.78	\$1,409	\$1,175	\$1,007	\$881
Every third vine	\$1.18	\$935	\$779	\$668	\$584
Every fourth vine	\$.89	\$705	\$587	\$504	\$441
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.46				
One rebar between posts	\$.23	\$182	\$152	\$130	\$113
Two rebars between posts	\$.30	\$238	\$198	\$170	\$149
Three rebars between posts	\$.35	\$277	\$231	\$198	\$173
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$.85	\$673	\$561	\$481	\$421
Every other vine	\$.43	\$337	\$281	\$241	\$210
Every third vine	\$.29	\$229	\$191	\$164	\$143
Every fourth vine	\$.21	\$166	\$138	\$118	\$103
Two wires		\$145	\$145	\$145	\$145
Three wires		\$218	\$218	\$218	\$218
Four wires		\$290	\$290	\$290	\$290
Five wires		\$362	\$362	\$362	\$362
Six wires		\$436	\$436	\$436	\$436
Seven wires		\$508	\$508	\$508	\$508
Eight wires		\$580	\$580	\$580	\$580

VINEYARD STAKES AND TRELLISES

WINE GRAPES

LYRE TRELLIS



Commonly used in wide row of 11' to 12'.

Materials: Heavy steel or wood end posts; heavy and medium T stakes with anchor plates; 8' to 12' gauge wires on metal open Lyre crossarms with a typical width of 42" at the top; 6 to 10 wires.

VINEYARD STAKES AND TRELLISES

WINE GRAPES

LYRE SYSTEM

11 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		792	660	566	495
		Cost Per Acre			
		5' x 11'	6' x 11'	7' x 11'	8' x 11'
13 end posts per acre with anchor	\$25	\$325	\$325	\$325	\$325
13 end posts per acre without anchor	\$18	\$234	\$234	\$234	\$234
Heavy steel stake with open lyre crossarm					
Every vine	\$9.00				
Every other vine	\$4.50	\$3,564	\$2,970	\$2,547	\$2,227
Every third vine	\$3.00	\$2,376	\$1,980	\$1,698	\$1,485
Every fourth vine	\$2.25	\$1,782	\$1,485	\$1,273	\$1,113
4' Rebar or pencil rod at each vine (between lyre crossarm)	\$46				
One rebar between lyres	\$23	\$182	\$152	\$130	\$114
Two rebars between lyres	\$30	\$238	\$198	\$170	\$148
Three rebars between lyres	\$35	\$277	\$231	\$198	\$173
Six wires		\$436	\$436	\$436	\$436
Seven wires		\$508	\$508	\$508	\$508
Eight wires		\$580	\$580	\$580	\$580
Nine wires		\$652	\$652	\$652	\$652
Ten wires		\$724	\$724	\$724	\$724

VINEYARD STAKES AND TRELLISES

WINE GRAPES

LYRE SYSTEM

12 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		726	605	518	454
		Cost Per Acre			
		5' x 12'	6' x 12'	7' x 12'	8' x 12'
12 end posts per acre with anchor	\$25	\$300	\$300	\$300	\$300
12 end posts per acre without anchor	\$18	\$216	\$216	\$216	\$216
Heavy steel stake with open lyre crossarm					
Every vine	\$9.00				
Every other vine	\$4.50	\$3,267	\$2,722	\$2,331	\$2,043
Every third vine	\$3.00	\$2,178	\$1,815	\$1,554	\$1,362
Every fourth vine	\$2.25	\$1,633	\$1,361	\$1,165	\$1,021
4' Rebar or pencil rod at each vine (between lyre crossarm)	\$46				
One rebar between lyres	\$23	\$167	\$139	\$119	\$104
Two rebars between lyres	\$30	\$218	\$182	\$155	\$136
Three rebars between lyres	\$35	\$254	\$212	\$181	\$159
Six wires		\$399	\$399	\$399	\$399
Seven wires		\$466	\$466	\$466	\$466
Eight wires		\$533	\$533	\$533	\$533
Nine wires		\$600	\$600	\$600	\$600
Ten wires		\$667	\$667	\$667	\$667

VINEYARD STAKES AND TRELLISES

MISCELLANEOUS

COMPONENT COSTS TO CALCULATE COSTS PER ACRE

WIRE PRICE PER ACRE

Based on 10' spacing between rows of vines and 13 gauge wire	
1 wire	\$80
2 wire	\$160
3 wire	\$240
4 wire	\$320
5 wire	\$400

METAL STAKES AND CROSSARMS

T-Post Stakes and Training Stakes			Metal Crossarms With U Bolts (Medium Grade)	
7'	.95 lbs/ft	\$1.55	6"	\$.40
7'	1.25 lbs/ft	\$2.00	12"	\$.57
6'	.95 lbs/ft	\$1.25	18"	\$.70
6'	1.25 lbs/ft	\$1.70	24"	\$.85
5'	.95 lbs/ft	\$1.10	30" to 34"	\$1.10
4'	Rebar Training Stake	\$.46	36"	\$1.65
4'	¼" Steel Training Stake	\$.36	42"	\$1.95

Heavy duty elaborate galvanized crossarms can run 40 to 50 percent more.

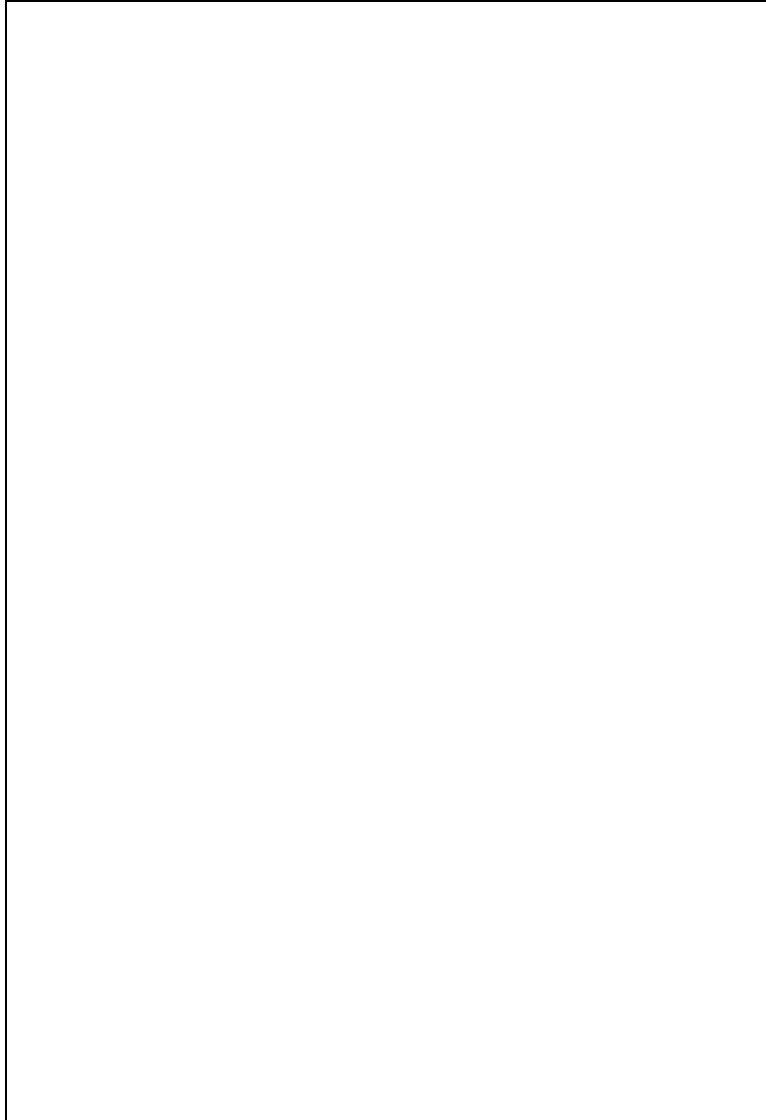
WOOD STAKES AND CROSSARMS

Stakes			Crossarms With Clips		Crossarms With U-Bolts	
5'	1 ¾" sq	\$1.21	12"	\$.45	12"	\$.45 - \$.55
6'	1 ¾" sq	\$1.48	24"	\$.60	24"	\$.75 - \$.90
7'	1 ¾" sq	\$1.79	30"	\$.70	30"	\$.85 - \$.95
8'	3" to 4"	\$2.75 – \$3.50	36"	\$.85	36"	\$.95 - \$1.05

Price varies with quality

VINEYARD STAKES AND TRELLISES

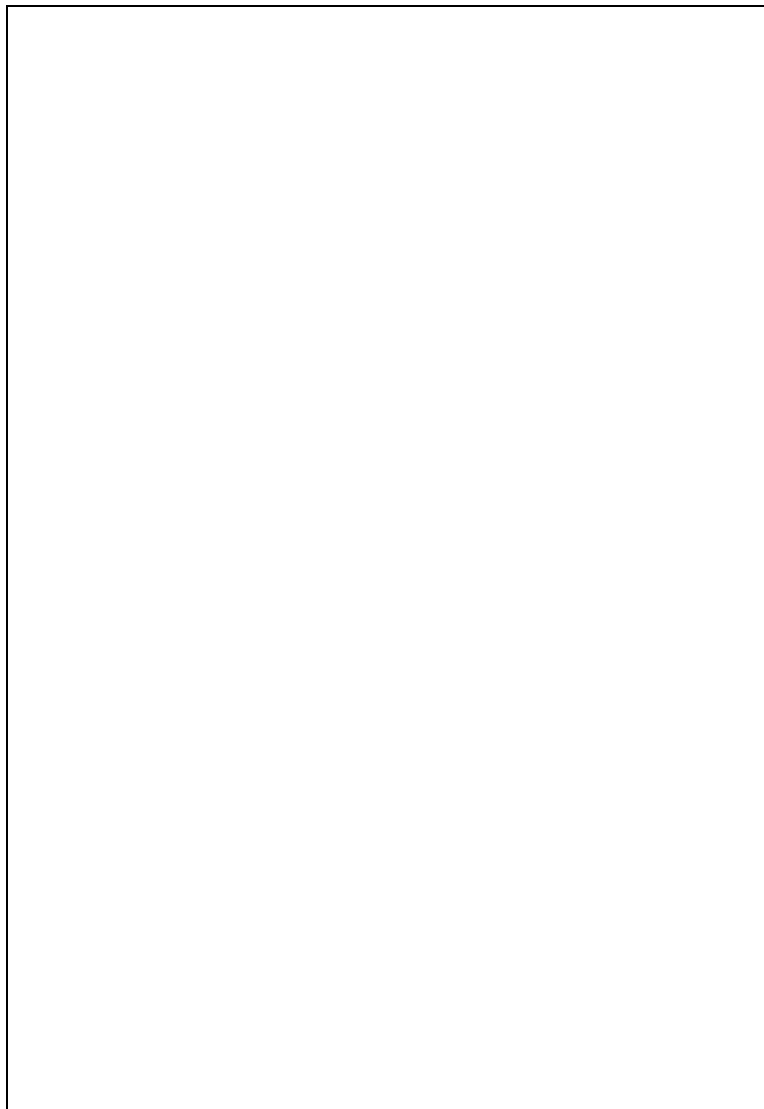
MISCELLANEOUS



4' Pencil rod and rebar

VINEYARD STAKES AND TRELLISES

MISCELLANEOUS



T-post with J.R. wire clips

7' heavy T-post: **\$2.00** installed

7' light T-post: **\$1.55** installed

J.R. clips: **\$.15** each

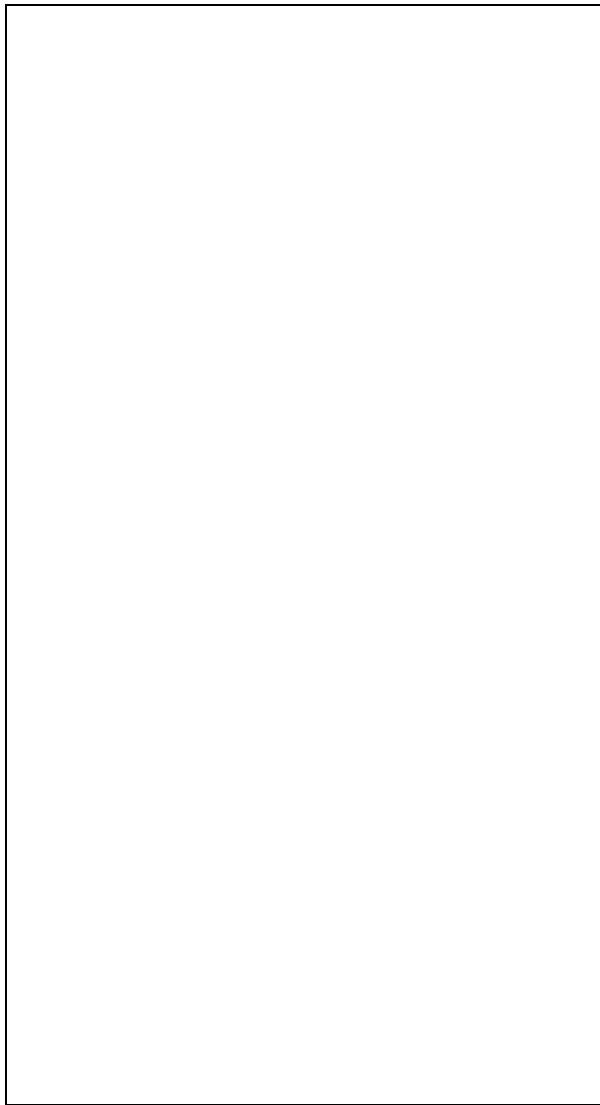


Vertical line post with wire slots

8' Vertical line post: **\$3.55** installed

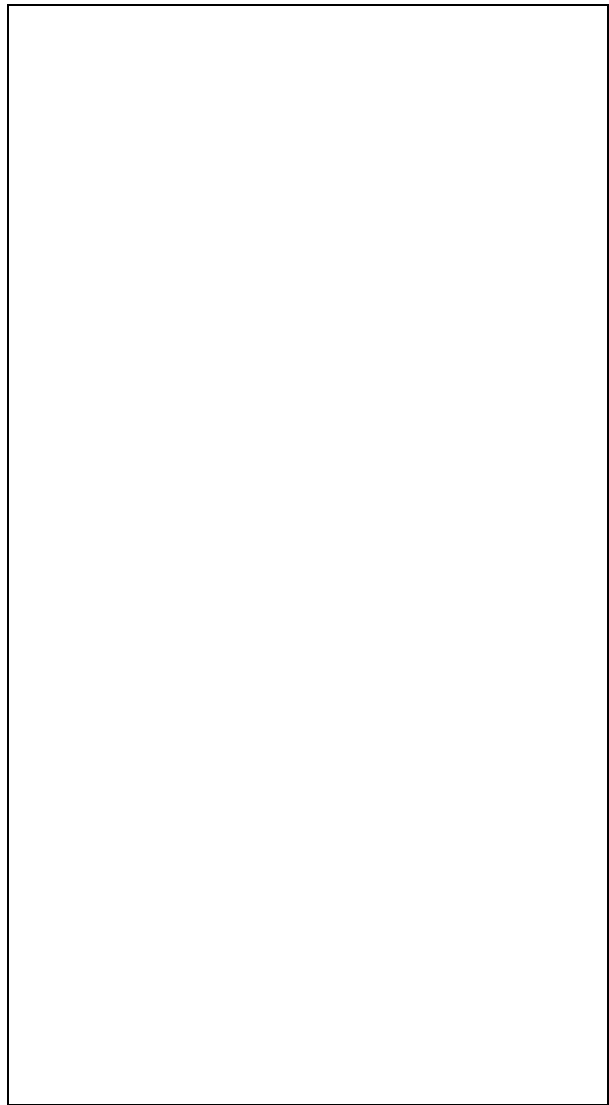
VINEYARD STAKES AND TRELLISES

MISCELLANEOUS



Steel end post with spade

\$14.00 to \$16.00 each
\$3.00 install



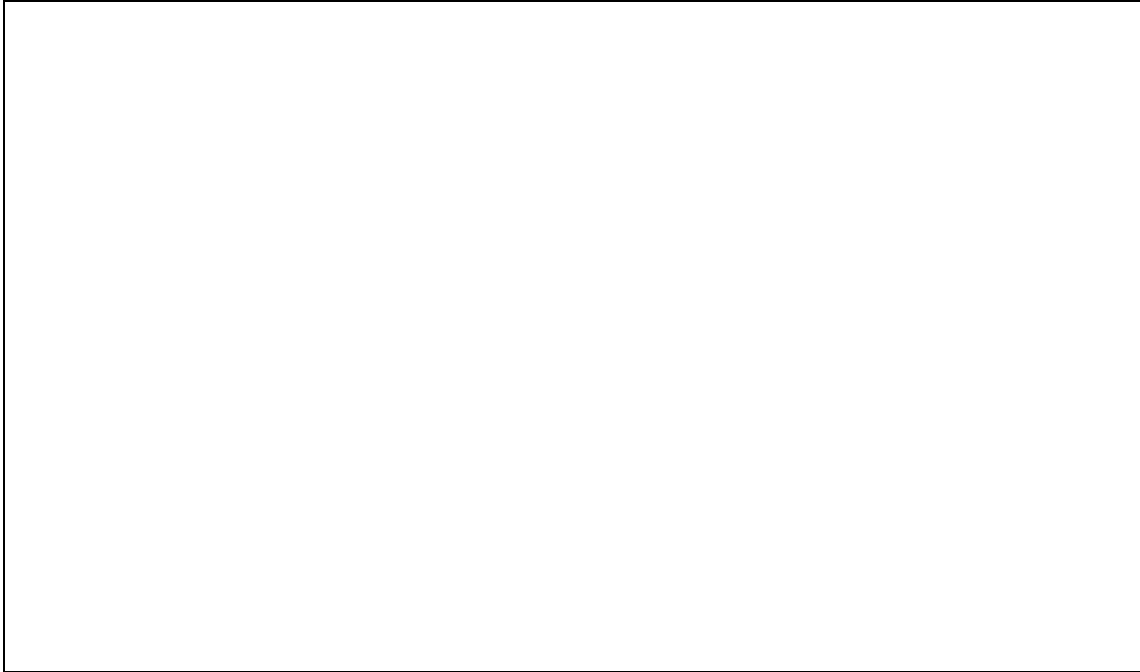
Screw-in earth anchor

4" x 30" : **\$3.25**
6" x 36" : **\$4.00**
\$3.00 install

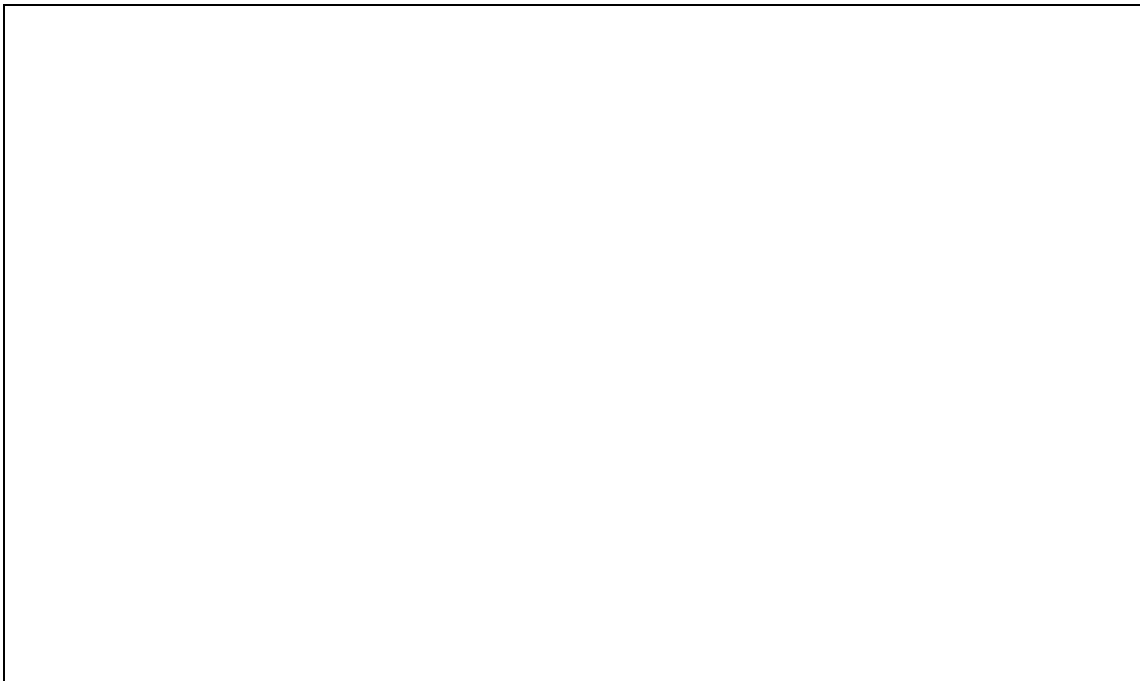
VINEYARD STAKES AND TRELLISES

MISCELLANEOUS

DEER FENCE



7' Deer fence made with 9' T-post and 9' wood stakes
6 ½' woven wire with 2 barbed wires on top
Cost: **\$3.50** to **\$4.25** per linear foot



VINEYARD STAKES AND TRELLISES

USEFUL INFORMATION

WIRE

10 Gauge	2,060 ft. Per 100 lbs. roll
11 Gauge	2,580 ft. Per 100 lbs. roll
12 Gauge	3,370 ft. Per 100 lbs. roll
13 Gauge	4,470 ft. Per 100 lbs. roll
14 Gauge	5,860 ft. Per 100 lbs. roll

PLANTING SPACING AND WIRE CHART

Planting Pattern Between Plants—Between Rows	One-Wire System No. of Wire Feet Required Per Acre	No. of Plants Required Per Acre
3' x 6'	7,260'	2,420
4' x 6'	7,260'	1,815
5' x 6'	7,260'	1,452
6' x 6'	7,260'	1,210
3' x 7'	6,222'	2,074
4' x 7'	6,222'	1,555
5' x 7'	6,222'	1,245
6' x 7'	6,222'	1,037
7' x 7'	6,222'	889
3' x 8'	5,445'	1,815
4' x 8'	5,445'	1,361
5' x 8'	5,445'	1,089
6' x 8'	5,445'	907
7' x 8'	5,445'	778
8' x 8'	5,445'	681
3' x 9'	4,850'	1,613
4' x 9'	4,850'	1,210
5' x 9'	4,850'	968
6' x 9'	4,850'	807
7' x 9'	4,850'	691
8' x 9'	4,850'	605
5' x 10'	4,355'	871
6' x 10'	4,356'	726
7' x 10'	4,354'	622
8' x 10'	4,352'	544
5' x 11'	3,960'	792
6' x 11'	3,960'	660
7' x 11'	3,962'	566
8' x 11'	3,960'	495
5' x 12'	3,630'	726
5½' x 12'	3,630'	660
6' x 12'	3,630'	605
7' x 12'	3,626'	518
8' x 12'	3,632'	454

AH 534.78: STEEL BUILDINGS

The *all steel* building serves a variety of functions for the farmer/rancher with its most common use being either storage space for farm machinery or storage of feeds and grains. The typical building as described in this section reflects the cost of a basic building.

In addition, there are instances where the building cost is modified for wall height, partitions, and extra electrical circuits within the structure.

BASIC BUILDING COST

Square-foot costs of basic buildings include the following components:

1. Foundation as required for normal soil conditions.
2. Concrete slab floor, 4 inches to 6 inches thick with wire mesh.
3. A steel building made up of these components:
 - Steel frame or bents, 20, 25, or 30 feet on center.
 - Steel roof purlin, 4 1/2 to 5 1/2 feet on center.
 - Steel wall girts 6 to 7 feet on center.
 - Twenty-six gauge galvanized steel on walls and roof.
 - Window area equal to 2 percent of floor area.
 - Minimal light fixtures—including wiring.
 - One rotary vent per bay.
 - Two walk-in doors.
 - Two overhead or sliding doors.
 - Fourteen-foot eave height.

Basic steel buildings are of two types: the low profile roof pitch (1" in 12") and the more conventional barn-like roof pitch (4" in 12"). The cost differential between the two is considered immaterial for appraisal purposes.

ADDITIVE COSTS

Additive costs are the in-place cost components not included in the basic square-foot cost but are those costs found as part of steel buildings. They are added to the basic building cost to arrive at a total building cost.

STEEL BUILDINGS

COST PER SQUARE FOOT

Length	Width											
	20'	25'	30'	35'	40'	45'	50'	55'	60'	65'	70'	80'
20'	18.05											
25'	17.85	17.49										
30'	17.49	16.93	16.27									
35'	16.93	16.27	15.40	14.89								
40'	16.42	15.40	15.25	14.48	14.08							
50'	15.25	14.69	14.33	14.03	13.41	12.80	12.55					
60'	14.69	14.64	14.03	13.41	12.85	12.55	12.29	11.93				
75'	14.33	14.03	13.46	12.85	12.65	12.34	11.93	11.58				
80'	14.03	13.46	12.85	12.55	12.34	11.93	11.58	11.32	11.02	10.71	10.46	10.30
90'	13.46	12.85	12.55	12.34	11.93	11.58	11.32	11.02	10.71	10.46	10.30	9.84
100'	12.85	12.60	12.34	11.93	11.58	11.32	11.02	10.71	10.40	10.30	9.84	9.59
135'		12.34	11.93	11.58	11.32	11.02	10.71	10.46	10.30	9.84	9.69	9.49
150'			11.58	11.32	11.02	10.71	10.46	10.30	9.84	9.59	9.49	9.28
175'				11.02	10.71	10.46	10.30	9.84	9.59	9.49	9.28	9.18
200'					10.46	10.30	9.84	9.59	9.49	9.28	9.18	9.03
225'						9.84	9.69	9.49	9.28	9.18	9.03	8.98
250'							9.49	9.28	9.18	9.03	8.98	8.98

ALTERNATE COSTS

Dirt Floor: Due to increased size of footings/foundation, no adjustment for dirt floor.

Wall Height: Add or subtract 3 percent per square foot from basic cost for each foot of variation above or below the basic 14-foot eave height.

Missing Wall Cover: Deduct **\$1.80** for each square foot of missing wall area.

Electrical Power: Deduct **\$1.50 - \$2.00** per square foot for lack of power.

The above costs are for 26 gauge steel cover.

STEEL BUILDINGS

ADDITIVE COSTS

The cost of additives, such as doors and windows, that replace a portion of the exterior skin of the building, reflects the net added cost of the component in-place. The cost of the skin that is replaced has been deducted from the total cost of the additive components. No further deduction is necessary.

OVERHEAD DOORS WITH CHAIN HOIST OPENERS

Width	Height				
	8'	10'	12'	14'	16'
8'	\$590	\$620	\$720	\$930	
10'	640	680	770	890	\$990
12'	680	800	900	1,070	1,150
14'	930	1,000	1,060	1,130	1,240
16'	1,030	1,110	1,180	1,270	1,660
18'	1,260	1,380	1,490	1,600	

WALK-IN DOORS

Flush 3' x 7'	\$440
Half Glass	\$500

ROTARY VENTS

20"	\$200
-----	-------

RIDGE VENTS

9" x 10'	\$375
12" x 10'	\$425

GUTTERS AND DOWNSPOUTS

Per lineal foot	\$5
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SKYLIGHTS

3' x 10'	\$60 - \$90
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WINDOWS

3' x 3'	\$130
3' x 6'	160
4' x 6'	210
4' x 8'	260

STEEL BUILDINGS

ADDITIVE COSTS

HEATING

Overhead Suspended Unit	Cost Per Unit
75,000 BTU	\$900
100,000 BTU	1,100
200,000 BTU	1,500
300,000 BTU	2,000

RESTROOMS

	Total Cost
Cost includes 2 fixtures, electrical service, and all partitions. Add for septic tank.	\$3,500 - \$4,500

OFFICE AREAS

	Square Foot
Cost includes partitioning, interior finish, trim, and doors	\$25 - \$35

PARTITIONS

	Per Surface Foot
Gypsum on wood frame	\$3.50
Plaster on wood frame	\$5.00
Paneling (average quality)	\$4.00 - \$5.00

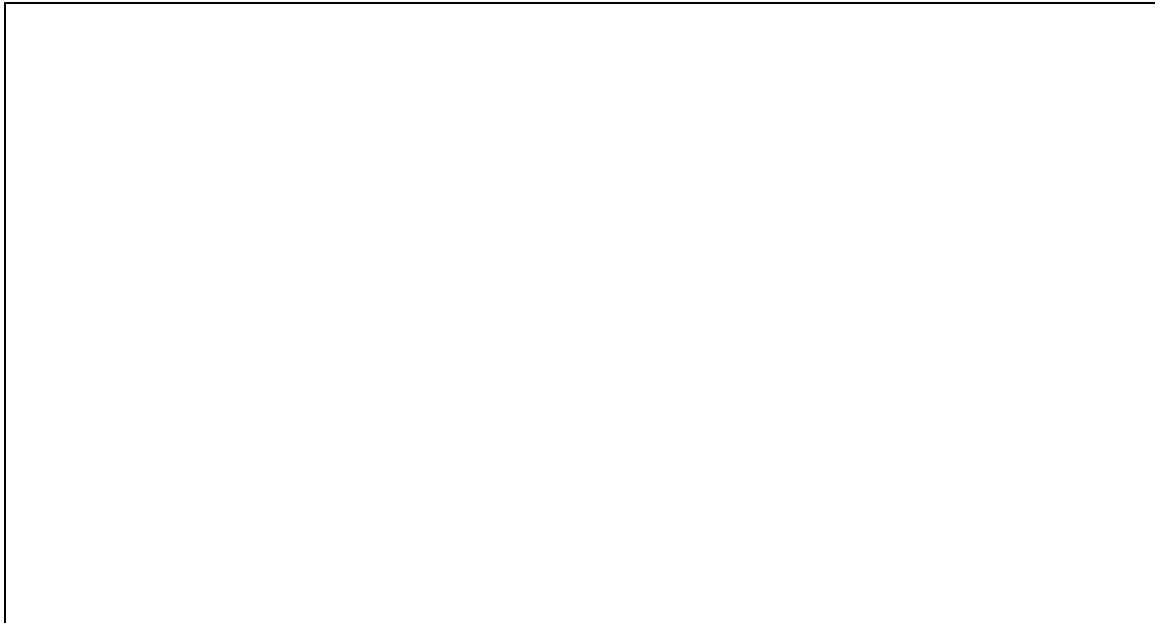
INSULATION

	Square Foot
R-11	\$.55 - \$.60
R-6	\$.45 - \$.50

STEEL BUILDINGS

PICTURES

AH 534.79: MISCELLANEOUS COSTS



MOTOR TRUCK SCALES WITH CONCRETE DECK

Scales			Scale Pit		
Tons Capacity	Platform Size	Total Cost	Size	Standard Cost	Add for: 12' Width
20	25' x 10'	\$ 9,250	25' x 10'	\$ 9,800	900
30	25' x 10'	10,200	40' x 10'	13,100	1,000
50	40' x 10'	15,700	50' x 10'	14,500	1,100
50	50' x 10'	16,650	60' x 10'	15,400	1,300
60	60' x 10'	18,100	70' x 10'	16,000	1,500
60	70' x 10'	21,250	80' x 10'	17,100	2,100
60	80' x 10'	23,950	90' x 10'	18,750	
80	80' x 10'	29,200	90' x 10'	18,750	
100	90' x 10'	32,250	100' x 10'	20,500	

ADD FOR WEIGHT RECORDING EQUIPMENT

Electronic indicator	\$1,000
Ticket printer	\$1,000

EXAMPLE OF MOTOR TRUCK SCALE COST

Scales: 80 ton capacity, 80' x 10' platform	\$29,200
Scale Pit: 90' x 10' size, standard	18,750

Electric weight recording equipment and printer	<u>2,000</u>
Total	\$49,950

MISCELLANEOUS COSTS

BULK-FEED TANKS

Size and Type	Cost
7 Tons	\$2,000
8 Tons	2,100
10 Tons	2,300
12 Tons	2,500
15 Tons	3,000
20 Tons	3,400
25 Tons	3,700
30 Tons	4,600
40 Tons	5,600
3-4 Tons Twin	\$1,200
4-5 Tons Twin	1,300
8 Tons Dairy Feed	2,300
12 Tons Dairy Feed	3,000
15 Tons Dairy Feed	3,500

Tanks are equipped with scissors-type opening chute.

CONCRETE GRAIN STORAGE SILOS

Reinforced Concrete Floor With Tilt-Up Concrete Exterior Walls	
1,500 square feet	\$8.00 per square foot
2,000 square feet	7.00 per square foot
2,500 square feet	6.50 per square foot
3,000 square feet	6.25 per square foot
3,500 square feet	6.00 per square foot
4,000 square feet	6.00 per square foot
5,000 square feet	5.00 per square foot
6,000 square feet	4.50 per square foot
8,000 square feet	3.60 per square foot

MISCELLANEOUS COSTS

ABOVE-GROUND FUEL TANKS & CONTAINMENT SYSTEMS

PREFABRICATED CONCRETE FUEL CONTAINMENT TUBS

400 gallon capacity containment	\$700
500 gallon capacity containment	\$900
1,000 gallon capacity containment	\$1,200

CONTAINMENT WITH TANK AND ELECTRIC PUMPS

500 gallon – diesel	\$3,500
1,000 gallon – diesel	\$4,600
500 gallon – gasoline	\$4,200
1,000 gallon – gasoline	\$5,400

ABOVE-GROUND FUEL TANKS (Steel Tanks with Thick Outer Shell of Concrete)

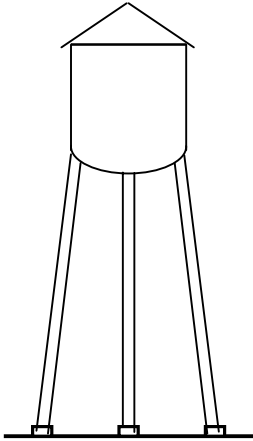
Gallons	Cost
500, with electric pump	\$4,000 - \$4,500
1,000, with electric pump	\$7,000
2,000, with electric pump	\$10,500
Double unit—(1) 1,000 gallon, (1) 500 gallon with 2 electric pumps	\$8,500 - \$8,800

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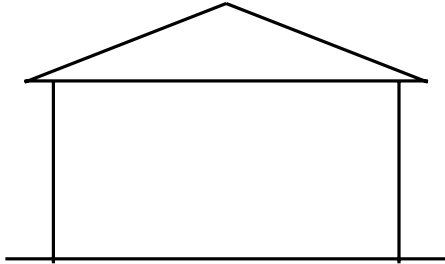
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MISCELLANEOUS COSTS

ELEVATED STEEL WATER STORAGE TANKS

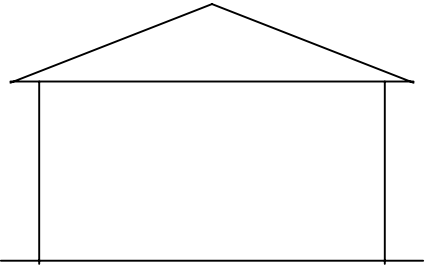
	Gallon Capacity	Total Cost of 75' Tower and Tank	Total Cost of 100' Tower and Tank
	25,000	\$160,000	\$185,000
	30,000	170,000	195,000
	40,000	180,000	200,000
	50,000	185,000	210,000
	60,000	192,000	220,000
	75,000	200,000	230,000
	100,000	230,000	250,000
	150,000	290,000	310,000
	200,000	360,000	380,000
	300,000	450,000	480,000
	500,000	600,000	640,000
	1,000,000	1,000,000	1,100,000

WELDED STEEL WATER STORAGE TANKS ON GROUND WITH FOUNDATION

	Gallon Capacity	Total Cost of Tank on Ground
	25,000	\$32,000
	30,000	36,000
	40,000	40,000
	50,000	48,000
	60,000	53,000
	75,000	63,000
	100,000	77,000
	150,000	90,000
	200,000	102,000
	300,000	129,000
	500,000	190,000
	1,000,000	280,000

MISCELLANEOUS COSTS

GALVANIZED STEEL WATER STORAGE TANKS ON CRUSHED ROCK BASE

	Gallon Capacity	Total Cost of Tank on Ground
	1,000	\$1,050
	1,500	1,260
	2,000	1,350
	2,500	1,525
	3,000	1,640
	4,500	2,020
	5,000	2,300
	6,000	2,500
	7,000	3,120
	8,000	3,440
	9,000	3,810
	10,000	4,100
	12,000	4,450
	14,000	5,100
	17,000	5,700
	20,000	6,720

Price varies due to gauge, height, diameter, and delivery costs.

Price typically includes crushed rock base.

Height varies from 4' to 24'; diameter varies from 7' 0" to 11' 11".

Tanks usually have 12-gauge floor with 12-gauge to 14-gauge walls.

POLYETHYLENE OR FIBERGLASS TANKS (Used for Ag Chemicals or Water)

Capacity (Gallons)	Cost
1,000	\$ 875
2,000	1,600
3,000	2,475
4,000	3,140
5,000	3,950
6,000	4,580
8,000	5,875
10,000	7,150

Add **\$2.50** per square foot for concrete base

MISCELLANEOUS COSTS

STEEL GRAIN BINS

Sacramento and Northern California

Steel grain bins are used for storage and drying of small grains. The typical storage bin has metal walls and roof, a concrete floor and foundation. The drying bin is of similar construction with a dryer floor, unloading auger, and leveler. Dryer fan, heater unit, and motor are also considered part of the drying bin.

MISCELLANEOUS COSTS

STEEL GRAIN BINS Sacramento and Northern California

GRAIN DRYING BINS

Diameter	Eave Heights											
	8'	10'	13'	16'	18'	21'	24'	32'	40'	48'	58'	64'
14'	11,120	11,325										
18'	12,550	13,160	13,465	13,770	14,485	14,790	16,320	20,195	22,950	25,195		
21'		14,790	15,300	15,710	16,320	17,035	18,870	23,260	25,910	29,275		
24'		16,935	17,340	17,950	18,615	19,585	21,830	26,775	29,685	33,970	38,045	41,515
27'		20,300	20,810	21,625	22,340	23,870	26,320	32,640	34,680	40,700	43,455	51,000
30'		22,850	23,260	24,075	25,095	26,520	28,970	35,700	39,575	45,085	53,040	58,140
36'			30,800	31,875	33,355	34,885	37,740	45,290	51,410	58,550	68,645	74,970
42'				39,375	39,885	42,025	49,370	57,835	66,200	73,545	86,190	92,415
48'				50,490	53,550	56,715	60,945	69,360	72,420	87,210	100,980	110,160

Includes cost of foundation, perforated floor, unloading auger, aeration unit, fan, dryer, and stirring devices.

GRAIN STORAGE BINS

Diameter	Eave Heights											
	8'	10'	13'	16'	18'	21'	24'	32'	40'	48'	58'	64'
14'	5,660	5,915										
18'	6,425	7,090	7,500	7,805	7,910	8,775	10,405	13,570	16,065	18,565		
21'		8,060	8,570	8,875	9,180	10,100	12,140	15,810	18,360	21,625		
24'		9,385	9,895	10,200	11,220	11,730	14,385	18,055	21,420	24,990	29,835	33,150
27'		11,220	11,730	12,240	13,260	14,895	17,595	22,950	25,500	30,910	37,230	41,055
30'		12,750	13,260	13,770	14,790	16,935	19,075	24,890	28,560	33,915	42,435	47,735
36'			17,340	18,465	19,485	21,625	24,790	31,620	36,925	44,370	54,875	61,200
42'				23,155	23,770	25,195	33,150	39,885	48,350	56,715	68,340	75,685
48'				32,030	34,680	37,740	42,840	49,470	56,610	66,300	80,580	89,250

Includes cost of bin foundation, door, ladder, and unloading auger.

ADD FOR: Roof Augers **\$650 - \$1,000** (depends on length—13' to 24')
Fan **\$1,700** (5 H.P.) to **\$3,100** (25 H.P.)

PERFORATED FLOORS

14'	18'	21'	24'	27'	30'	36'	42'	48'
\$1,150	\$1,700	\$2,100	\$2,700	\$3,300	\$4,100	\$5,700	\$7,400	\$9,000

MISCELLANEOUS COSTS

2-INCH REDWOOD WATER STORAGE TANKS

Gallons	Diameter	Height	Cost
500	5'	4'	\$2,250
1,000	6'	6'	2,650
1,500	7'	6'	3,307
2,000	8'	6'	3,950
3,000	10'	6'	5,300
4,000	10'	8'	6,350
5,000	11'	8'	7,250
6,000	12'	8'	8,350
7,000	11'	10'	8,750
8,000	12'	10'	9,250
9,000	13'	10'	10,200
10,000	14'	10'	11,350
12,000	15'	10'	12,400
15,000	14'	14'	14,300

Above costs include chime joists, covers, foundation, and all labor, set up,
and transportation charges.

ADD FOR: Ladders **\$15** per lineal foot
 Water level registers **\$10** per lineal foot of tank height
 Cone covers **\$225 - \$450** per tank

MISCELLANEOUS COSTS

3-INCH REDWOOD WATER STORAGE TANKS

Gallons	Diameter	Height	Cost
10,000	14'	10'	\$16,800
12,000	14'	12'	19,850
15,000	16'	12'	21,300
20,000	18'	12'	27,500
25,000	17'	16'	30,000
30,000	20'	14'	34,850
40,000	23'	14'	42,650
50,000	24'	16'	48,850
60,000	26'	16'	54,800
70,000	28'	16'	58,400
75,000	29'	16'	66,150
80,000	30'	16'	71,450
90,000	30'	18'	74,970
100,000	32'	18'	80,300
150,000	37'	20'	110,500
200,000	43'	20'	134,000

Above costs include typical foundation, chime joists, tank cover, and all labor, set up, and transportation charges.

CYLINDRICAL 3-INCH REDWOOD WINE TANKS

Gallons Capacity	Base Price
1,000	\$4,080
1,500	5,440
2,000	6,240
2,500	7,540
3,000	8,780
4,000	9,390
5,000	11,618
7,500	14,340
10,000	15,820
15,000	21,870
20,000	26,750
25,000	29,420
30,000	33,170

Base price includes 4" x 6" chime joists, 1/2' galvanized hoops, recessed head cover, side door with galvanized T-bolt.

MISCELLANEOUS COSTS

STAINLESS STEEL WINE TANKS

Gallons Capacity	Cost
1,000	\$5,150
2,000	7,200
3,000	8,240
4,000	9,250
5,000	10,300
10,000	12,360
20,000	20,000
50,000	36,000
100,000	61,500
200,000	111,000

Cost includes all valves, temperature controls, vents, and cooling jackets for tanks with a capacity of 20,000 gallons or less. The cost on tanks of 50,000 gallons or more excludes cooling jackets.

CYLINDRICAL 2 INCH OAK TANKS

Gallons Capacity	Base Price
500	\$1,930
750	2,800
1,000	3,600
1,250	4,430
1,500	5,150
2,000	7,200
2,500	8,300
3,000	9,575
4,000	12,800
5,000	15,400
6,000	18,500

Base price includes 4" x 6" chime joists, galvanized hoops, head supports with stainless steel head bolts, side door with stainless T-bolt, installation in Sonoma County. Foundations not included.

MISCELLANEOUS COSTS

PREFABRICATED METAL SHADES

SPECIFICATIONS

Foundation	Metal base plate with tie downs
Floor	Dirt
Wall/Roof Frame	2 3/8" galvanized structural tubing (4' on center) 7' to 9' eaves
Roofing	29-gauge steel with baked on enamel (extends 6" to 12" below eaves)
Exterior Wall Covering	None

COMMON SIZES

12' x 21'	\$980	20' x 21'	\$1,700
12' x 26'	1,190	20' x 26'	2,080
12' x 31'	1,560	20' x 31'	2,540
12' x 36'	1,820	20' x 36'	2,960
12' x 41'	2,080	20' x 41'	3,360

ADDITIVES

- Add 6 percent to above prices for 26-gauge steel roofing
- 29-gauge metal wall covering—**\$1.00** per square foot of wall (standard roofing extends 6" to 12" below eaves)
- Back enclosure kit:
 - 12-foot wide—**\$300**
 - 20-foot wide—**\$335**
- Front enclosure kit with opening for roll-up door:
 - 12-foot wide—**\$300**
 - 20-foot wide—**\$350**
- Roll-up door—**\$600-\$800**
- Walk-thru door—**\$300**
- Add 3 percent for each additional foot of wall height above 9 feet
- Concrete floor—**\$2.75 to \$3.00** per square foot

MISCELLANEOUS COSTS
PREFABRICATED METAL SHADES
PICTURES

AH 534.80: WIND MACHINES

NEW

New machines will average a physical life of 30 years. Typical usage will average 100 - 150 hours per year. Each wind machine will service approximately 10 acres.

WIND MACHINES

Model	Cost
G.P. 359 Cummins Diesel	\$19,500
130 H-P Ford V-10 L.P.G.	\$17,000
130 H-P Ford 460 L.P.G.	\$16,100
115 H-P John Deere 4045T Diesel	\$17,500
100 H-P Electric	\$14,100
75 H-P Electric	\$13,600
Portable Low Crop 115 H-P John Deere	\$19,300
Portable Low Crop V-10 Ford L.P.G.	\$18,900

Tower height for above machines is 35 feet.

OPTIONS

Item	Cost
41 Foot Tower	\$800
Auto Thermostat Control	\$2,800
Variable Speed Rotation	\$1,400
Contour Assembly	\$3,500

Above prices include foundation and installation.

WIND MACHINES

USED

USED ELECTRIC MACHINES

H-P	Model	Cost
12 1/2*	Frostmaster	\$2,000
12 1/2*	Tropic Breeze	\$2,000
25*	Frostmaster (Wood Fan)	\$2,700
25*	Frostmaster (Metal Fan)	\$2,700
25*	Tropic Breeze	\$2,700
35*	Frostmaster	\$3,000
40*	Tropic Breeze 900 RPM	\$4,000
40*	Tropic Breeze Teeter Hub Fan	\$4,000
50*	Tropic Breeze Teeter Hub Fan	\$4,250
50*	Tropic Breeze 900 RPM	\$4,500
60*	Tropic Breeze 900 RPM	\$5,000
60*	Tropic Breeze Teeter Hub Fan	\$5,000
75	Tropic Breeze 900 RPM	\$5,000
75	Tropic Breeze Teeter Hub Fan	\$5,000
100	Tropic Breeze 900 RPM	\$5,500
100	Tropic Breeze Teeter Hub Fan	\$5,500
125	Tropic Breeze 900 RPM	\$7,000
125	Tropic Breeze Teeter Hub Fan	\$7,250

The cost of used wind machines can vary widely depending upon the age and condition of the equipment.

USED GAS & *PROPANE MACHINES

H-P	Model	Cost
223-6	Gasoline 68 H-P	\$4,500
240-6	Gasoline 68 H-P	\$5,000
292-V-8	Gasoline 86 H-P	\$6,200
332-V-8	Gasoline 86 H-P	\$6,200
300-6	Gasoline 92 H-P	\$6,500
391-V-8	Gasoline 100 H-P	\$7,500
391-V-8	Gasoline 125 H-P	\$8,000
460-V-8	Gasoline 125 H-P	\$9,000

All the above machines can be converted to propane if desired. Cost will be **\$600** additional for each motor.

DIESEL MACHINES (REBUILT ENGINES)

330 Ford *	6 Cylinder	Diesel - 81 H-P	\$8,000
363 Ford *	6 Cylinder	Diesel - 100 H-P	\$9,000
378 Cummins *	V-6	Diesel - 125 H-P	\$9,000

The above prices include a 550 gallon above-ground fuel tank. Larger tanks are available on request at additional cost.

- Denotes: No longer made

WIND MACHINES

RECONDITIONED

RECONDITIONED ELECTRIC MACHINES

Model		Cost
100 H-P	Phoenix	\$6,200
100 H-P	Tropic Breeze PODS	\$6,200
75 H-P	Tropic Breeze PODS	\$5,700
75 H-P	Tropic Breeze D. Flange	\$5,200
50 H-P	900 RPM	\$4,500

RECONDITIONED GROUND POWERED TROPIC BREEZE

Model		Cost
292 H-P	Ford, Propane	\$7,500
332 H-P	Ford, Propane	\$7,250
300 H-P	Ford, Propane	\$8,250
391 H-P	Ford, Propane	\$9,500
460 H-P	Ford, Propane	\$10,000
In Line 6	John Deere, Diesel	\$12,500
In Line 6	Cummins, Diesel	\$12,000
V-6	Cummins, Diesel	\$10,500

RECONDITIONED EOT

Model		Cost
223 H-P	Ford, Gas	\$4,250
292 H-P	Ford, Propane	\$5,250
391 H-P	Ford, Propane	\$8,250
460 H-P	Ford, Propane	\$9,250

NOTE: All used costs listed above include foundation and installation.

WIND MACHINES

ABBREVIATIONS

GP	Ground Power
RT	Rotating Tower
TT	Tall Tower
ST-ROT	Standard Rotation
SP-ROT	Special Rotation
LC	Low Crop
S	Single
D	Dual
EOT	Engine on Tower
SC	Special Contour

WIND MACHINES

PICTURES

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AVERAGE LIFE TABLES

MISCELLANEOUS IMPROVEMENTS

<u>Use Type of Improvement</u>	<u>Quality/Type</u>	<u>Type of Schedule</u>	<u>Average Life</u>
Barns (General Farm)	Poor	R.	20
Barns (General Farm)	Fair	R.	30
Barns (General Farm)	Good	R.	40
Barns (General Farm)	Excellent	R.	60
Barns, Dairy	Poor	R.	20
Barns, Dairy	Average	R.	20
Barns, Dairy	Good	R.	25
Cold Storage Food Lockers	Poor	O.R.	30
Cold Storage Food Lockers	Average	O.R.	40
Cold Storage Food Lockers	Good	O.R.	50
Cold Storage Warehouses	Poor	O.R.	40
Cold Storage Warehouses	Average	O.R.	50
Cold Storage Warehouses	Good	O.R.	60
Cotton Gins		O.R.	30
Drive-In Theaters	Poor	O.R.	20
Drive-In Theaters	Good	O.R.	30
Drying Sheds (Fruits & Nuts) (Wood Frame)	Poor	R.	10
Drying Sheds (Fruits & Nuts) (Wood Frame)	Fair	R.	20
Drying Sheds (Fruits & Nuts) (Wood Frame)	Good	R.	30
Fences, Wood or Wire	Poor	R.	10
Fences, Wood or Wire	Average	R.	20
Fences, Wood or Wire	Good	R.	30
Fences, Chain Link, Residence-Farm	Light	R.	20
Fences, Chain Link, Industrial-Commercial	Good	R.	30

DEPRECIATION

AVERAGE LIFE TABLES

MISCELLANEOUS IMPROVEMENTS

<u>Use Type of Improvement</u>	<u>Quality/Type</u>	<u>Type of Schedule</u>	<u>Average Life</u>
Frost Protection Wind Machines		R.	30
Grain Elevators	Concrete and Metal	O.R.	50
Grain Storage Bins	Metal	O.R.	40
Grain Storage Bins	Concrete	O.R.	60
Greenhouses, Commercial	Poor Wood Frame	O.R.	20
Greenhouses, Commercial	Average	O.R.	30
Greenhouses, Commercial	Good	O.R.	40
Greenhouses, Conservatory (Back Yard)	Poor	R.	10
Greenhouses, Conservatory (Back Yard)	Good	R.	20
Hog and Sheep Sheds and Corrals	Poor	R.	10
Hog and Sheep Sheds and Corrals	Fair	R.	20
Hog and Sheep Sheds and Corrals	Good	R.	30
Lath Houses	Poor	R.	10
Lath Houses	Fair	R.	20
Lath Houses	Good	R.	30
Motor Truck Scales	Wood Under-structure	O.R.	30
Motor Truck Scales	Wood Under-structure	O.R.	40
Poultry Houses	Poor	R.	10
Poultry Houses	Medium	R.	20
Poultry Houses	Good	R.	30
Rice Drying and Storage Plants	Concrete and Metal	O.R.	50

DEPRECIATION

AVERAGE LIFE TABLES

MISCELLANEOUS IMPROVEMENTS

<u>Use</u> <u>Type of Improvement</u>	<u>Quality/Type</u>	<u>Type of Schedule</u>	<u>Average Life</u>
Service Stations	Poor Wood Frame	O.R.	20
Service Stations	Good Wood Frame, or Light Steel, or Masonry	O.R.	25
Service Stations	Good Wood Frame, or Light Steel, or Masonry	O.R.	30
Silos, Wood	Poor	R.	20
Silos, Wood	Good	R.	30
Silos, Masonry - Tile and Basalite		R.	40
Silos, Masonry - Concrete		R.	50
Steel Building, Quonset or Straight Wall Type (Steel Frame)	Light	O.R.	40
Steel Building, Quonset or Straight Wall Type (Steel Frame)	Medium	O.R.	50
Steel Building, Quonset or Straight Wall Type (Steel Frame)	Heavy	O.R.	60
Storage Sheds (Frame)	Poor	R.	20
Storage Sheds (Frame)	Fair	R.	30
Storage Sheds (Frame)	Good	R.	40
Swimming Pools	Poor	R.	10
Swimming Pools	Fair	R.	20
Swimming Pools	Good	R.	30
Water Tanks, Elevated	Wood Frame and Tank	O.R.	30
Water Tanks, Elevated	Wood Frame and Tank	O.R.	60

Poor = Poorest grade of materials; not contractor erected.

Fair = Average materials; builder erected.

Good = Good materials; good design; erected by competent builder.

DEPRECIATION

NORMAL PERCENT GOOD TABLES - RESIDENTIAL BUILDINGS

Age Years	20 Years Avg Life		25 Years Avg Life		30 Years Avg Life		40 Years Avg Life	
	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good
0	20	100	25	100	30	100	40	100
1	19	94	24	95	29	96	39	98
2	18	88	23	90	28	93	38	96
3	17	81	22	86	27	89	37	94
4	16	75	21	81	26	86	36	92
5	15	69	20	77	25	82	35	90
6	14	63	19	72	24	79	34	87
7	13	59	18	68	23	75	33	84
8	12	57	17	63	22	71	32	82
9	11	55	16	60	21	67	31	80
10	11	53	16	58	20	64	30	77
11	10	50	15	56	19	60	29	74
12	9	48	14	54	19	59	28	72
13	8	46	13	53	18	57	27	70
14	7	44	12	51	17	56	27	67
15	7	42	11	49	16	54	26	65
16	6	40	11	48	15	53	25	62
17	5	38	10	46	14	52	24	60
18	5	36	9	44	13	50	23	59
19	4	33	8	43	13	49	22	58
20	4	31	7	41	12	47	21	56
21	3	29	7	39	11	46	21	55
22	3	27	6	37	11	44	20	54
23	3	25	6	35	10	43	19	53
24	3	23	5	34	9	42	18	52
25	2	21	5	32	9	40	17	51
26	2	19	4	30	8	39	17	50
27	2	16	4	29	7	37	16	49
28	2	14	4	27	7	36	15	48
29	2	12	3	25	6	34	14	47
30	1	10	3	24	6	33	14	46
31			3	22	5	31	13	45
32			3	20	5	30	12	44
33			2	18	5	29	12	43
34			2	17	4	17	11	42
35			2	15	4	26	11	41
36			2	13	4	24	10	40
38			1	10	3	21	9	38
40					2	19	7	35
42					2	16	6	33
46					1	10	5	29
50							4	25
55							3	20
60							2	14
64							1	10

DEPRECIATION

NORMAL PERCENT GOOD TABLES - RESIDENTIAL BUILDINGS

Age Years	45 Years Avg Life		50 Years Avg Life		55 Years Avg Life		60 Years Avg Life	
	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good
0	45	100	50	100	55	100	60	100
2	43	97	48	97	53	98	58	98
4	41	93	46	94	51	96	56	96
6	39	89	44	91	49	94	54	94
8	37	85	42	88	47	91	52	92
10	35	81	40	85	45	88	50	90
12	33	77	38	82	43	85	48	88
14	32	73	36	78	41	82	46	86
16	30	69	35	74	40	79	45	83
18	28	65	33	70	38	76	43	80
20	26	60	31	67	36	73	41	77
22	24	58	29	63	34	69	39	74
24	23	56	28	60	32	65	37	71
26	22	54	26	58	31	62	35	68
28	20	52	24	56	29	60	34	65
30	18	50	23	54	27	58	32	63
32	17	48	21	53	26	56	30	60
34	15	47	20	51	24	55	29	58
36	14	45	18	49	23	53	27	57
38	12	43	17	47	21	51	26	55
40	11	41	16	45	20	50	24	54
42	10	39	14	44	19	48	23	52
44	9	37	13	42	17	46	21	51
46	8	35	12	40	16	45	20	49
48	7	33	11	38	15	43	19	47
50	6	31	10	37	14	41	18	46
52	5	29	9	35	12	40	16	44
54	5	28	8	33	11	38	15	43
56	4	26	7	31	10	36	14	41
58	4	24	6	30	9	35	13	40
60	3	22	5	28	8	33	12	38
62	3	20	4	26	7	31	11	37
64	3	18	4	24	6	30	10	35
66	2	16	3	22	5	28	9	33
68	2	14	3	21	5	27	8	32
70	2	12	3	19	4	25	7	30
72	1	10	2	17	4	23	6	29
76			2	14	3	20	5	26
80			1	10	2	17	4	23
84					1	10	2	16
96							1	10

DEPRECIATION

NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

Age Years	20 Years Avg Life		25 Years Avg Life		30 Years Avg Life		35 Years Avg Life	
	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good
0	20	100	25	100	30	100	40	100
1	19	95	24	97	29	98	34	99
2	18	90	23	93	28	96	33	97
3	17	85	22	90	27	93	32	95
4	16	79	21	86	26	90	31	93
5	15	73	20	82	25	88	30	91
6	14	67	19	78	24	85	29	89
7	13	61	18	74	23	82	28	87
8	12	56	17	70	22	79	27	85
9	11	51	16	65	21	75	26	83
10	10	49	15	60	20	72	25	80
11	9	48	14	56	19	68	24	78
12	9	46	13	52	18	65	23	75
13	8	44	12	50	17	61	22	72
14	7	43	11	48	16	58	21	69
15	6	43	10	47	15	54	20	66
16	6	41	9	46	14	50	19	63
17	5	39	8	45	13	49	18	60
18	5	38	8	44	12	48	17	57
19	5	37	7	43	12	47	16	54
20	4	35	7	42	11	47	15	51
21	4	34	6	41	11	46	14	50
22	4	33	6	40	10	45	13	49
23	3	32	5	39	10	44	13	48
24	3	30	5	38	9	43	12	47
25	3	29	5	37	9	43	12	47
26	3	28	4	36	8	42	11	46
27	2	27	4	35	8	41	11	45
28	2	25	4	34	7	40	10	44
29	2	24	4	33	7	39	10	43
30	2	22	3	32	6	38	9	43
31	2	21	3	31	6	37	9	42
32	1	20	3	30	5	36	8	42
33			3	29	5	35	8	41
34			3	28	5	35	7	40
35			2	27	5	34	7	39
36			2	26	4	33	6	38
38			2	24	4	32	6	37
40			2	22	3	30	5	36
42			1	20	3	28	5	34
45					2	26	4	32
48					2	23	3	30
52					1	20	3	27
56							2	24
62							1	20

DEPRECIATION

NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

Age Years	40 Years Avg Life		45 Years Avg Life		50 Years Avg Life		55 Years Avg Life	
	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good	Rem Life Years	Percent Good
0	40	100	45	100	50	100	55	100
2	38	98	43	99	48	99	53	99
4	36	96	41	97	46	98	51	98
6	34	93	39	95	44	97	49	97
8	32	90	37	93	42	95	47	96
10	30	86	35	90	40	93	45	95
12	28	82	33	87	38	91	43	94
14	26	78	31	84	36	88	41	92
16	24	73	29	81	34	85	39	90
18	22	68	27	77	32	82	37	88
20	20	63	25	73	30	80	35	86
22	18	58	23	69	28	77	33	83
24	17	53	21	65	26	73	31	80
26	15	50	20	60	24	69	29	77
28	14	48	18	55	23	65	27	74
30	13	47	17	50	21	61	26	71
32	11	45	15	49	20	57	24	67
34	10	44	14	48	18	53	22	63
36	9	43	13	47	17	50	21	59
38	8	42	12	46	16	48	19	55
40	8	40	11	44	14	47	18	52
42	7	39	10	43	13	46	17	50
44	6	38	9	42	12	45	16	49
46	6	36	8	41	11	44	15	48
48	5	35	7	40	10	43	14	47
50	5	34	7	38	10	42	13	45
52	4	32	6	37	9	41	12	44
54	4	31	6	36	8	40	11	43
56	3	30	5	35	8	39	10	42
58	3	29	5	34	7	38	9	41
60	3	27	4	32	7	37	9	40
62	2	26	4	31	6	36	8	39
64	2	25	4	30	6	35	8	38
66	2	24	3	29	5	34	7	37
68	2	22	3	28	5	33	7	36
70	2	21	3	27	4	32	6	36
72	1	20	3	25	4	31	6	35
74			2	24	5	30	5	34
76			2	23	3	28	5	32
82			1	20	3	26	4	30
84					2	24	4	29
88					2	22	3	27
92					1	20	2	25
96							2	23
102							1	20

DEPRECIATION

NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

Age Years	60 Years Average Life		70 Years Average Life	
	Remaining Life Years	Percent Good	Remaining Life Years	Percent Good
0	60	100	70	100
2	58	99	68	99
4	56	99	66	99
6	54	98	64	99
8	52	97	62	98
10	50	96	60	98
12	48	95	58	97
14	46	94	56	96
16	44	93	54	96
18	42	92	52	95
20	40	89	50	94
22	38	87	48	93
24	36	85	46	92
26	34	83	45	91
28	32	81	42	89
30	30	78	40	87
32	29	75	39	85
34	27	72	37	83
36	25	69	35	81
38	24	66	33	79
40	22	63	31	76
42	21	60	30	73
44	20	56	29	70
46	18	52	27	67
48	17	49	26	64
50	16	48	25	61
52	15	47	23	58
54	14	46	22	56
56	13	46	21	54
58	12	45	20	52
60	11	44	19	50
64	10	42	17	48
68	9	40	15	46
72	8	38	13	44
76	7	36	12	43
80	6	35	11	41
86	5	32	9	39
92	4	29	8	36
100	3	25	6	33
108	2	22	4	29
112	1	20	3	27
122			2	24
130			1	20